Proceedings of the American Academy of Arts and Sciences

VOL. 71, NO. 10—MARCH, 1937

RECORDS OF MEETINGS, 1935–36

BIOGRAPHICAL NOTICES

OFFICERS AND COMMITTEES FOR 1936–1937

LIST OF THE FELLOWS AND FOREIGN HONORARY MEMBERS

STATUTES AND STANDING VOTES

RUMFORD PREMIUM

INDEX

(TITLE PAGE AND TABLE OF CONTENTS)

RECORDS OF MEETINGS

One Thousand Two Hundred and Twenty Fourth Meeting

OCTOBER 9, 1935—STATED MEETING

The Academy met at its House at 8.15 P. M.

The PRESIDENT in the Chair.

There were present fifty-seven Fellows and seven guests.

The records of the meeting of May 8 were read and approved.

The Corresponding Secretary reported the receipt of letters accepting Fellowship from Charles Henry Beeson, Charles Henry Blake, Gilbert Ames Bliss, Robert Johnson Bonner, J. Frank Daniel, Tyler Dennett, Bernard Ogilvie Dodge, Oliver Lanard Fassig, Tenney Frank, Jerome Davis Greene, Charles Grove Haines, Louis Harris, Clark Leonard Hull, Warren Judson Mead, Charles Elwood Mendenhall, Benjamin Dean Meritt, Karl Friedrich Meyer, Nicholas Athanasius Milas, Henry Alexander Murray, Jr., Henry Washington Prescott, Tracy Jackson Putnam, Floyd Karker Richtmyer, Henry Arthur Sanders, James Brown Scott, Henry Lee Shattuck, Walter Raymond Spalding, Robert Jemison Van de Graaff, Bertram Eugene Warren, Derwent Stainthorpe Whittlesey, Robert Sessions Woodworth; and of letters accepting Foreign Honorary Membership from Luigi Einaudi, John Maynard Keynes, René Maunier, Sir William Wright Smith, S. Rudolph Steinmetz.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To James A. Beattie, Associate Professor of Physical Chemical Research, Massachusetts Institute of Technology, $500, to assist him in making a study of the relation existing between the International Temperature Scale and the thermodynamic scale.

2. To N. T. Bobrovnikoff, Acting Director, Perkins Observatory, Delaware, Ohio, $600, for the construction of a grating spectrograph for the Cassegrain focus of the 69-inch Perkins Reflector, to aid an investigation of stellar spectra in the visual and infra-red regions.

3. To Joseph C. Boyce, Assistant Professor of Physics, Massachusetts Institute of Technology, $400, to be spent for equipment,

supplies, and assistance in an investigation of the extreme ultraviolet spectra of certain elements.

4. To Edward Franklin Castetter, Professor of Biology, University of New Mexico, Albuquerque, $100, to aid in the expenses of a field study of the wild plants used for food, ceremonials, and medicine by the Mojave Indians.

5. To Dr. T. T. Chen, Sterling Research Fellow, Yale University, New Haven, $300, to aid in completing his collection of Opalinid Ciliates inhabiting frogs and toads, as a means of furthering his study of the biology of this group.

6. To Thomas Harper Goodspeed, Professor of Botany, University of California, Berkeley, $750, to assist in financing an expedition to South America for the purpose of collecting seeds and specimens of plants of the genus Nicotiana. These specimens are necessary for the completion of a full monographic treatment of the genus from the cytogenetic as well as the taxonomic point of view.

7. To Helmut Landsberg, Instructor in Geophysics, Pennsylvania State College, $300, for assistance in compiling and evaluating data in an investigation of suspensions in air, with particular reference to the problem of unchanged particles of larger radii.

8. To K. Lark-Horowitz, Professor of Physics, Purdue University, Lafayette, Indiana, $300, to be used for the purchase of certain equipment to be used in a study of low energy particles emitted in nuclear disintegration processes.

The President announced the death of eight Fellows: Carl Barus (Class I, Section 2), Edward Salisbury Dana (Class II, Section 1), Edwin Brant Frost (Class I, Section 1), Arthur Dehon Little (Class I, Section 3), Charles Martin Tornov Loeffler (Class IV, Section 4), Charles Elwood Mendenhall (Class I, Section 2), Benjamin Lincoln Robinson (Class II, Section 2), Denman Waldo Ross (Class IV, Section 4); and of one Foreign Honorary Member: Hugo de Vries (Class II, Section 2).

The adoption of the following resolution was moved by Mr. E. V. Huntington and seconded by Mr. J. H. Beale:

Whereas, this Academy voted in 1929 in favor of a simplification of the calendar; and

Whereas, the League of Nations in 1931 proposed two plans for serious consideration, namely, the original thirteen-month plan (which

was the only plan before the Academy in 1929) and a newer twelve-month equal-quarters plan (known as the World Calendar); and

Whereas, under present conditions the twelve-month plan appears to be the only plan that has any chance of world-wide adoption; be it therefore

Resolved, that the American Academy of Arts and Sciences hereby approves the twelve-month equal-quarters plan for the simplification of the calendar, and would welcome its world-wide adoption.

The Academy voted unanimously to adopt it.

Dr. Walter B. Cannon reported that the Academy had received from a committee representing Keiogijuku University, Tokyo, an appeal for contributions towards the building of a medical library as a memorial to the late Professor Kitasato, the well-known Japanese bacteriologist. He suggested that an announcement be printed in the November notice of meeting to the effect that members who might wish to contribute might send their contributions to the Treasurer of the Academy before December 15.

Consent was given by the Academy.

The following communications were presented:

Mr. Louis W. McKeehan: "The Structure of Intermetallic Compounds."

Mr. Hans Kurath: "The Speech of Coastal New England: A Study in Linguistic Geography," illustrated with lantern slides.

One paper was read by title: "Compressibilities and Electrical Resistance under Pressure, with Special Reference to Intermetallic Compounds," by P. W. Bridgman.

The meeting was dissolved at 9.50 P. M.

One Thousand Two Hundred and Twenty Fifth Meeting

NOVEMBER 13, 1935—STATED MEETING

The Academy met at its House at 8.15 P. M.

The PRESIDENT in the Chair.

There were present thirty-five Fellows and one guest.

The records of the meeting of October 9 were read and approved.

The Corresponding Secretary reported the receipt of letters resigning Fellowship from Richard C. Cabot and Thomas N. Carver.

He also announced that the Council had made a grant of $750 from the Permanent Science Fund to Professor Norton A. Kent, of Boston

University, for certain expenses connected with mounting a spectrograph in a vibrationless manner, in order that he may continue to measure the wave lengths of the secondary spectrum of hydrogen with high accuracy.

The President announced the death of two Fellows: Charles Loring Jackson (Class I, Section 3), and Henry Fairfield Osborn (Class II, Section 3); and of one Foreign Honorary Member: Sylvain Lévi (Class IV, Section 3).

The following communication was presented:

Mr. Leo Rich Lewis: "Possibilities as to a Thematic Catalogue of the World's Music."

One paper was read by title: "Some New Results in the Problem of Plateau," by Jesse Douglas.

The meeting was dissolved at 9.35 P. M.

One Thousand Two Hundred and Twenty Sixth Meeting

DECEMBER 11, 1935—STATED MEETING

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present thirty-eight Fellows.

The records of the meeting of November 13 were read and approved.

The President announced the death of three Fellows: David Gordon Lyon (Class IV, Section 3), Lafayette Benedict Mendel (Class I, Section 3), and Milman Parry (Class IV, Section 3).

The following communication was presented:

Mr. Roscoe Pound: "The Military Telegraph in the Civil War."

Two papers were read by title: "Philippine Phoridae from the Mount Apo Region in Mindanao," by Charles T. Brues; "The Specific Volume of Steam in the Saturated and Superheated Condition together with Derived Values of the Enthalpy, Entropy, Heat Capacity, and Joule Thomson Coefficients. Part IV. Steam Research Program," by Frederick G. Keyes, Leighton B. Smith, and Harold T. Gerry.

The meeting was dissolved at 9.20 P. M.

One Thousand Two Hundred and Twenty Seventh Meeting

JANUARY 8, 1936—STATED MEETING

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present fifty-five Fellows and seven guests.

The records of the meeting of December 11 were read and approved.

The Corresponding Secretary reported the receipt of invitations to the Academy to be represented by delegates at the Inauguration of the President of the University of Oregon on February 6, 1936; at the Anglo-American Conference of Historians at London in July 1936; and at the celebration of the Tercentenary of Harvard University on September 16 to 18, 1936.

The President announced the death of three Fellows: William Elwood Byerly (Class I, Section 1), Albert Spear Hitchcock (Class II, Section 2), Henry Taber (Class I, Section 1); and of one Foreign Honorary Member: Rufus Daniel Isaacs, Marquess of Reading (Class III, Section 4).

On recommendation of the Council, it was

Voted, To appropriate the sum of $25 from the income of the General Fund for use at the discretion of the President.

The following communication was presented:

Mr. Robert P. Blake: "Lake Van," illustrated with lantern slides.

Two papers were read by title: "Revision of the Nearctic Raphidiodea (Recent and Fossil)," by F. M. Carpenter; "A Study of the Nolanaceae," by I. M. Johnston.

The meeting was dissolved at 9.35 P. M.

One Thousand Two Hundred and Twenty Eighth Meeting

FEBRUARY 12, 1936—STATED MEETING

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present thirty-five Fellows and one guest.

The records of the meeting of January 8 were read and approved.

The Corresponding Secretary announced that the President had appointed Professor William Albert Setchell of the University of California as delegate of the Academy to the Inauguration of the President of the University of Oregon, and of Professor Edwin

Herbert Hall of Harvard as delegate to the celebration of the Tercentenary of Harvard University.

The President announced the death of one Fellow: George Woodward Wickersham (Class III, Section 1); and of two Foreign Honorary Members: Francis Crawford Burkitt (Class IV, Section 1) and Rudyard Kipling (Class IV, Section 4).

The following communication was presented:

Mr. Kirsopp Lake: "The New Manuscripts from Egypt."

The meeting was dissolved at 9.25 P. M.

One Thousand Two Hundred and Twenty Ninth Meeting

MARCH 11, 1936—STATED MEETING

The Academy met at its House at 8.25 P. M.

The PRESIDENT in the chair.

There were present thirty-nine Fellows and two guests.

The records of the meeting of February 12 were read and approved.

The Nominating Committee was appointed by the President as follows:

Elmer P. Kohler, of Class I
Roger I. Lee, of Class II
Thomas N. Perkins, of Class III
William S. Ferguson, of Class IV

The Corresponding Secretary announced that the President, Dean Roscoe Pound, had consented to represent the Academy at the Centenary Celebrations of the University of London, June 29 to July 3, 1936.

On the recommendation of the Council the following appropriations were made for the ensuing year:

From the income of the General Fund, $7,175, to be used as follows:

for General and Meeting expenses	$ 900
for Library expenses	2,000
for Books, Periodicals, and Binding	1,500
for House expenses	2,000
for Treasurer's expenses	675
for use at the discretion of the President	100

From the income of the Publication Funds, $2,367.17, to be used for publication.

From the income of the Rumford Fund, $2,953.55, to be used as follows:

for Research	$1,850.00
for Books, Periodicals, and Binding	325.00
for use at the discretion of the Committee	778.55

From the income of the C. M. Warren Fund, $879.70, to be used at the discretion of the Committee.

The following communication was presented:

Mr. Harry R. Mimno: "Recent Progress in Radio Transmission Research," illustrated with lantern slides.

The meeting was dissolved at 9.45 P. M.

One Thousand Two Hundred and Thirtieth Meeting

APRIL 8, 1936—STATED MEETING

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present thirty-nine Fellows and three guests.

The records of the meeting of March 11 were read and approved.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To Professor Arthur A. Blanchard, Massachusetts Institute of Technology, Cambridge, $200, for technical assistance in an investigation of the composition and properties of the compound formed by the action of phosphorus trichloride on nickel carbonyl.

2. To Professor Charles T. Brues, Harvard University, Cambridge, $1,300, to provide the expenses of a field trip to secure Cretaceous amber containing inclusions of insects.

3. To Dr. Joseph Copeland, College of the City of New York, $500, to aid in the publication of a monograph entitled "Ecological and taxonomic studies of the thermal blue-green algae (Myxophyaceae) of the Yellowstone hot springs."

4. To Professor Robley D. Evans, Massachuestts Institute of Technology, Cambridge, $300, for constructing an electric furnace to be used in a series of studies of the age of various minerals.

5. To Dr. and Mrs. Carroll L. Fenton, West Liberty, Iowa, $350, to aid them in a critical study of certain corals.

6. To Professor Louis F. Fieser, Harvard University, Cambridge, $1,000, for aid in the study of the composition of various natural compounds by a new method of precision analysis.

7. To Professor Harry R. Mimno, Harvard University, Cambridge, $500, for expenses in connection with making certain ionosphere observations in Russia and Turkestan during the total eclipse of the sun which will occur on June 19, 1936.

8. To Dr. Wilson M. Powell, Connecticut College for Women, New London, $220, for certain apparatus to be used in studying light intensities.

9. To Professor Paul Weiss, University of Chicago, $300, for providing moving picture equipment to be used in studying movements of supernumerary (grafted) muscles and limbs in the Amphibia.

The President announced the death of Charles Allerton Coolidge, Fellow in Class IV, Section 4.

The following communication was presented:

Dr. Willy Hartner: "Ancient Star Symbols and Constellations," illustrated with lantern slides.

The meeting was dissolved at 9.10 P. M.

One Thousand Two Hundred and Thirty First Meeting

MAY 13, 1936—ANNUAL MEETING

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present forty-one Fellows and four guests.

The records of the meeting of April 8 were read and approved.

The President announced the death of two Fellows:—William Hubert Burr (Class I, Section 4), Charles Howard Walker (Class IV, Section 4); and of one Foreign Honorary Member:—Karl Pearson (Class IV, Section 2).

The following report of the Council was presented:

REPORT OF THE COUNCIL

Since the last report of the Council there have been reported the deaths of twenty Fellows:—Carl Barus, William Hubert Burr, William Elwood Byerly, Charles Allerton Coolidge, Edward Salisbury Dana, Edwin Brant Frost, Albert Spear Hitchcock, Charles Loring Jackson,

Arthur Dehon Little, Charles Martin Tornov Loeffler, David Gordon Lyon, Lafayette Benedict Mendel, Charles Elwood Mendenhall, Henry Fairfield Osborn, Milman Parry, Benjamin Lincoln Robinson, Denman Waldo Ross, Henry Taber, Charles Howard Walker, George Woodward Wickersham; and six Foreign Honorary Members:—Francis Crawford Burkitt, Rudyard Kipling, Sylvain Lévi, Karl Pearson, Rufus Daniel Isaacs, Marquess of Reading, Hugo de Vries.

Thirty Fellows and five Foreign Honorary Members were elected by the Council and announced to the Academy in May 1935.

The roll now includes 766 Fellows and 120 Foreign Honorary Members (not including those elected in May 1936).

The annual report of the Treasurer, Ingersoll Bowditch, was read, of which the following is an abstract:

GENERAL FUND

Receipts

Income on hand April 1, 1935		$2,887.99	
From Investments	$2,435.86		
From Assessments	4,100.00		
From Admissions	130.00		
From Rumford Fund Income	200.00	6,865.86	$9,753.85

Expenditures

Assistant Librarian	$2,000.00		
Expenses of Library	37.00		
Treasurer's Expenses	817.92		
Books and Binding	1,155.76		
General Expenses	925.32		
House Expenses	2,045.83		
President's Expenses	55.00	$7,036.83	
Income transferred to Principal		323.00	$7,359.83

RUMFORD FUND

Receipts

Income on hand April 1, 1935		$ 447.56	
From Investments		3,182.00	$3,629.56

Expenditures

Purchase and Binding of books	$ 455.77		
Research	2,355.72		
Transferred to General Fund Income for care of books	200.00		
Transferred to Publication Account	100.00	$3,111.49	
Income transferred to Principal		170.00	$3,281.49

PUBLICATION ACCOUNT

Receipts

Income on hand April 1, 1935		$2,517.73	
From Income—Appleton Fund	$1,078.50		
From Income—Centennial Fund	1,701.53		
From Income—Rumford Fund	100.00		
From Sale of Publications	487.81		
From American Council of Learned Societies a/c Lake Publication Fund	500.00		
From Lake Fund subscriptions	1,463.74	5,331.58	$7,849.31

Expenditures

Publications—			
General Fund	$3,633.65		
Rumford Fund	100.00		
Lake Fund	2,614.14	$6,347.79	
Vault Rent—part		4.40	$6,352.19
Interest on Bonds bought	$ 9.55		
Income transferred to Principal	150.64	160.19	$6,512.38

C. M. WARREN FUND

Receipts

Income on hand April 1, 1935		$ 156.16	
From Investments		956.49	$1,112.65

Expenditures

Research	$ 791.50		
Vault rent—part	2.20	$ 793.70	
Interest on Bonds bought	$ 33.14		
Income transferred to Principal	47.50	80.64	$ 874.34

FRANCIS AMORY FUND

Receipts

Income on hand April 1, 1935	$3,555.16	
From Investments	2,684.77	$6,239.93

Expenditures

Publishing Statement	$ 86.60	
Interest on Bonds bought	38.72	
Vault rent—part	6.60	$ 131.92

PERMANENT SCIENCE FUND

Receipts

Income on hand April 1, 1935	$ 250.00	
Received for above fund	5,767.52	$6,017.52

Expenditures

Grants from above fund	$5,100.00	
Expenses	17.52	$5,117.52

The following reports were also presented:

REPORT OF THE LIBRARY COMMITTEE

During the year 101 volumes and 16 unbound numbers of serials have been borrowed by 16 Fellows and 14 libraries, and more have been consulted at the Academy. All books taken out have been returned or satisfactorily accounted for.

The number of volumes on the shelves at the time of the last report was 44,346. During the year 419 volumes were added, largely by binding serials, making the number now 44,765. This includes 38

purchased from the General Fund, 20 from the Rumford Fund, and 361 received by gift or exchange. The number of pamphlets added was 69.

The following appropriations were placed at the disposal of the Librarian during the past year:

Balance from General Fund	$ 331.54
Balance from Rumford Fund	66.48
Appropriation from General Fund	3,700.00
Appropriation from Rumford Fund	400.00
	$4,498.02

The expenses charged to the library account during the financial year ending March 31, 1936 were:

Salaries		$2,000.00
Binding:		
General Fund	$579.70	
Rumford Fund	61.40	641.10
Purchase of Books and Periodicals:		
General Fund	$576.06	
Rumford Fund	394.37	970.43
Miscellaneous		37.00
		$3,648.53

There remained an unexpended balance of $849.49, as follows:

General Fund	$ 838.78
Rumford Fund	10.71
	$ 849.49

In accordance with the usual custom this balance will be carried over to next year.

Respectfully submitted,
ALFRED C. LANE, *Librarian*

May 13, 1936.

Report of the Rumford Committee

The following report of the Rumford Committee for the Academy year (April 1, 1935 to March 31, 1936) is presented by the Recording Secretary instead of by the Chairman as usual on account of the continued incapacity of the Chairman, A. E. Kennelly.

The Rumford Committee held three meetings during the year on April 11, November 12, and December 11, 1935. The Committee made the following grants from the Rumford Fund in aid of researches in light and heat.

	No.		*Amount*
Apr. 11	322	To Professor Simon Freed, University of Chicago, toward an apparatus for the liquefaction of hydrogen	$ 350
Apr. 11	323	To Professor G. W. Kenrick, Tufts College, for the purchase of apparatus for investigations of the Kennelly-Heaviside layer	250
Apr. 11	324	To Professor Otto Struve, Yerkes Observatory, for apparatus for the photometric study of the night sky	300
Nov. 12	325	To Professor C. F. Brooks, Blue Hill Observatory, for the purchase of a 12-junction pyrheliometer	100
Nov. 12	326	To Professor George Harrison, Massachusetts Institute of Technology, for the purchase of salts of the rare earths for spectroscopic analysis	300
Nov. 12	327	To Dr. T. E. Sterne, Harvard Astronomical Observatory, for the purchase of a galvanometer for astroradiometric studies	400
Dec. 11	328	To Dr. Joseph C. Boyce, Massachusetts Institute of Technology, for an ultraviolet lens for spectroscopic studies of the coming eclipse	200
Dec. 11	329	To Assistant Professor Harald H. Neilsen, Ohio State University, for a special echelette grating for infra-red spectroscopy	350
		Total	$2,250

Respectfully submitted,

P. W. Bridgman, *Recording Secretary.*

Report of the C. M. Warren Committee

The Committee had at its disposal during the fiscal year $986.34 of which $793.70 was expended.

Since the last annual report grants have been made as follows:

Dr. Edward S. Gilfillan, Jr., Massachusetts Institute of Technology, $200, to be used to continue his work on the separation of isotopes.

Professor W. Albert Noyes, Jr., Brown University, $200, for the study of the absorption spectra of some simple polyatomic molecules in the extreme ultraviolet.

Dr. Hermann Schmid, Technische Hochschule, Vienna, $150, for the purchase of apparatus to be used in the study of intermediate compounds formed in chemical reactions.

Dr. Frederick C. Schmidt, Union College, $90, for the purchase of apparatus to be used in the determination of heats of formation, solution and dilution in liquid ammonia.

Dr. Charles E. Teeter, Jr., Harvard University, $150, to aid in the study of the accurate measurement of the Joule-Thomson coefficient and heat capacity of methane.

A grant of $100 was made to Dr. Arthur A. Vernon of Rhode Island State College, but other means of procuring aid was found and the grant was relinquished.

Nine applications for grants totaling $2,780 will be acted upon at the next meeting of the committee.

Reports have been received from Messrs. Alter, Bradt, Allen, Skau, Schmidt, Scott, Johnson, Richtmyer, Kriebel.

The papers listed below, which have not been previously reported, describe the results of investigations aided by the Warren Fund. In each case there was an acknowledgment by the author of the assistance received.

Evald L. Skau and Louis F. Rowe, "Purification and Physical Properties of Organic Compounds. X. The Freezing Point Diagram of the System Acetanilide-Propionanilide," J. Am. Chem. Soc., *57*, 2437 (1935).

Clyde R. Johnson, "The Atomic Mass of Potassium II," J. Phys. Chem., *39*, 781 (1935).

Nelson K. Richtmyer and C. S. Hudson, "The Rearrangement of Sugar Acetates by Aluminum Chloride," J. Am. Chem. Soc., *57*, 1716 (1935).

Raymond K. Main and L. A. Schmidt, "The Combination of Divalent Manganese with Certain Proteins, Amino Acids and Related Compounds," J. of Gen. Physiology, *19*, 127 (1935).

I. M. Kolthoff and Charles Rosenblum, "Structural Changes Taking Place during the Aging of Freshly Formed Precipitates. III. The Mechanism of the Aging of Lead Sulphate Precipitated at Room Temperature," J. Am. Chem. Soc., *57*, 597 (1935).

JAMES F. NORRIS, *Chairman.*

May 13, 1936.

REPORT OF THE COMMITTEE OF PUBLICATION

The Committee of Publication has held four meetings during the year 1935–36. There have been published in the same period nine parts of the Proceedings (volume 70, no. 4 to volume 71, no. 2), two numbers of the Memoirs (volume 18, nos. 1 and 2), and two fascicles (nos. III and IV) of the first series of Monumenta Palaeographica Vetera.

The amounts received and expended by the Committee during the fiscal year ending 31 March last are shown in the following statements.

General Publication Fund 1935–36

Receipts

Balance 1 April 1935	$2,052.54
Appropriation 1935–36	2,645.52
Rumford Fund, grant 1935–36	100.00
Sale of Publications	487.81
	$5,285.87

Expenses

Transferred to Lake Publication Fund		$ 500.00
Printing: Memoirs, vol. 18, no. 1	$ 664.76	
Memoirs, vol. 18, no. 2	669.69	
Proceedings, General Fund	2,011.68	
Proceedings, Rumford Fund	100.00	
Total Printing		$3,406.13
Binding Proc. Vol. 69		28.35
Other expenses, postage, envelopes, trucking etc.		303.57
Balance 1 April 1936		1,047.82
		$5,285.87

Lake Publication Fund 1935–36

Receipts

Balance 1 April 1935		$ 299.17
Transferred from General Fund		500.00
Subvention from American Council of Learned Societies		500.00
Subscriptions received		1,463.74
		$2,762.91

Expenses

Plates, Fasc. IV	$1,410.14	
Text and Binding Fasc. III	466.64	
Text and Binding Fasc. IV	545.33	
		$2,422.11
Other expenses paid		192.03
Balance 1 April 1936		148.77
		$2,762.91

The edition of the Dated Greek Manuscripts was set originally at three hundred (see Proceedings, vol. 70, p. 482); actually three hundred and fifty copies were issued, and, at its meeting of 23 October 1935, the Committee voted to confirm and to maintain this increase in the size of the edition. The number of subscribers is at present seventy-five.

J. WHATMOUGH, *Chairman.*

REPORT OF THE HOUSE COMMITTEE

The House Committee has had funds at its disposal amounting to $2,777.75, made up as follows:

Balance from previous year	$ 567.75
Appropriations for 1935–36	2,000.00
Received for use of rooms	210.00
	$2,777.75

Of this amount the sum of $2,141.50 has been spent for the routine expenses, janitor, light, power, heat, telephone, etc., and $114.33 has

been spent for upkeep and equipment, making a total expenditure of $2,255.83, and leaving an unexpended balance of $521.92.

Meetings have been held as follows:

The Academy	8
American Antiquarian Society	1
American Chemical Society, Northeastern Section	8
Archaeological Institute of America, Boston Society	3
Friends of China, Inc.	2
Geological Society of Boston	2
Japan Society of Boston	1
Mediaeval Academy of America	1
New England Botanical Club	9
New England Farm and Garden Association	1
Total	36

The Council Chamber has been used for the Academy Council and Committee meetings, and also by the Trustees of the Children's Museum, the New England Farm and Garden Association, etc.

A detailed list of expenditures follows:

Janitor	$ 971.00
Electricity: Light	173.16
Power	48.49
Fuel	608.62
Elevator	100.25
Gas	45.20
Telephone	108.33
Water	38.64
Ash tickets	9.90
Upkeep	114.33
Janitor's supplies and sundries	37.91
	$2,255.83

Respectfully submitted,

S. Burt Wolbach, *Chairman.*

May 13, 1936.

On the recommendation of the Treasurer, it was *Voted*, That the annual assessment for the ensuing year be ten dollars.

The annual election resulted in the choice of the following officers and committees:

ROSCOE POUND, *President*
JAMES FLACK NORRIS, *Vice-President for Class I*
WALTER BRADFORD CANNON, *Vice-President for Class II*
EDWIN FRANCIS GAY, *Vice-President for Class III*
ARTHUR STANLEY PEASE, *Vice-President for Class IV*
TENNEY LOMBARD DAVIS, *Corresponding Secretary*
WALTER EUGENE CLARK, *Recording Secretary*
INGERSOLL BOWDITCH, *Treasurer*
HERVEY WOODBURN SHIMER, *Librarian*
WILLIAM CHASE GREENE, *Editor*

Councillors for Four Years

LAWRENCE J. HENDERSON, of Class I — JOHN A. COUSENS, of Class III
HANS ZINSSER, of Class II — JOSHUA WHATMOUGH, of Class IV

Finance Committee

THOMAS BARBOUR — PAUL J. SACHS — ALFRED L. RIPLEY

Rumford Committee

HARLOW SHAPLEY, *Chairman*

ELIHU THOMSON — HARRY M. GOODWIN — NORTON A. KENT
PERCY W. BRIDGMAN — CHARLES L. NORTON — GEORGE W. PIERCE

C. M. Warren Committee

JAMES F. NORRIS, *Chairman*

GREGORY P. BAXTER — TENNEY L. DAVIS — REID HUNT
WALTER L. JENNINGS — FREDERICK G. KEYES — CHARLES A. KRAUS

Committee of Publication

WILLIAM C. GREENE, *Chairman*

EDWIN C. KEMBLE, of Class I — JOSEPH H. BEALE, of Class III
FREDERIC T. LEWIS, of Class II — ROBERT P. BLAKE, of Class IV

Committee on the Library

HERVEY W. SHIMER, *Chairman*

RAYMOND C. ARCHIBALD, of Class I NATHAN ISAACS, of Class III
THOMAS BARBOUR, of Class II HENRY B. WASHBURN, of Class IV

Auditing Committee

GEORGE R. AGASSIZ ALEXANDER FORBES

House Committee

S. BURT WOLBACH, *Chairman*

WILLIAM H. LAWRENCE ROBERT P. BIGELOW JEROME C. HUNSAKER

Committee on Biographical Notices

DAVIS R. DEWEY, *Chairman*

JAMES F. NORRIS JOSEPH H. BEALE
ALFRED C. LANE WALTER E. CLARK SAMUEL E. MORISON

Committee on Meetings

THE PRESIDENT
THE RECORDING SECRETARY

HARLOW SHAPLEY LEIGH HOADLEY ABBOTT P. USHER
JOSHUA WHATMOUGH

The Corresponding Secretary announced that the following had been elected members of the Academy:

FELLOWS

CLASS I

Section 3. Harold Simmons Booth, Cleveland, Ohio
Albert Baird Hastings, Cambridge
Ernest Hamlin Huntress, Melrose Highlands
Avery Adrian Morton, Watertown
Section 4. Murray Philip Horwood, Newton Center

CLASS II

Section 3. Frederick Lee Hisaw, Cambridge
Section 4. Oswald Theodore Avery, New York, N. Y.
Charles Sidney Burwell, Brookline

Class III

Section 1. Stoughton Bell, Cambridge
Wilfred Bolster, Brookline
Claude Raymond Branch, Providence, R. I.
Charles Thornton Davis, Marblehead
Philip Stanley Parker, Brookline
Henry Parkman, Jr., Boston
Stanley Elroy Qua, Lowell
Sidney Post Simpson, Cambridge

Section 2. Howard Landis Bevis, Cambridge
Morris Bryan Lambie, Cambridge

Section 3. James Waterhouse Angell, New York, N. Y.
James Cummings Bonbright, New York, N. Y.
Philip Cabot, Milton
Edward Hastings Chamberlin, Cambridge
Fred Rogers Fairchild, New Haven, Conn.
Frank Albert Fetter, Princeton, N. J.
Roswell Cheney McCrea, New York, N. Y.
Malcolm Perrine McNair, Cambridge
Elton Mayo, Cambridge
Thomas Henry Sanders, Cambridge
Joseph Henry Willits, Philadelphia, Pa.

Section 4. Dumas Malone, Cambridge
Clair Elsmere Turner, Arlington

Class IV

Section 1. Robert Pierce Casey, Providence, R. I.

Section 2. Donald Scott, Cambridge

Section 4. William Clifford Heilman, Cambridge

FOREIGN HONORARY MEMBERS

Class I

Section 4. Edward Victor Appleton, London

Class II

Section 1. Raoul Blanchard, Grenoble, France

Section 4. Hyacinthe Vincent, Paris

Class IV

Section 1. Miguel Asín y Palacios, Madrid
Section 2. Marcel Aubert, Paris
Section 3. Paul Kretschmer, Vienna

The following communication was presented:
Mr. Julius Seelye Bixler: "The Skeptical Revolt."
The meeting was dissolved at 9.30 P. M.

BIOGRAPHICAL NOTICES

CARL BARUS ..... R. B. LINDSAY 484
WILLIAM KEITH BROOKS ..... R. P. BIGELOW 489
WILLIAM ELWOOD BYERLY ..... E. H. HALL 492
GILMAN ARTHUR DREW ..... F. R. LILLIE 494
EPHRAIM EMERTON ..... W. S. FERGUSON 496
ADOLF ENGLER ..... ALFRED REHDER 497
EDWIN BRANT FROST ..... FRANK SCHLESINGER 500
RICHARD BURDON HALDANE ..... ROSCOE POUND 503
ALBERT SPEAR HITCHCOCK ..... M. L. FERNALD 505
ALBERT ANDREW HOWARD ..... J. D. M. FORD 507
JOSEPH JACQUES CESAIRE JOFFRE ..... ALBERT SAUVEUR 508
ARTHUR DEHON LITTLE ..... F. G. KEYES 513
CHARLES MARTIN LOEFFLER ..... W. R. SPALDING 519
ERNEST GALE MARTIN ..... W. B. CANNON 523
ANTOINE MEILLET ..... LOUIS H. GRAY 524
LAFAYETTE BENEDICT MENDEL ..... F. G. BENEDICT 527
CHARLES ELWOOD MENDENHALL ..... J. C. SLATER 529
ALBERT ABRAHAM MICHELSON ..... R. A. MILLIKAN 530
HAROLD MURDOCK ..... F. R. HART 533
MILMAN PARRY ..... W. C. GREENE 535
WILLIAM LAMBERT RICHARDSON ..... DAVID CHEEVER 536
BENJAMIN LINCOLN ROBINSON ..... M. L. FERNALD 539
DENMAN WALDO ROSS ..... CHARLES HOPKINSON 543
WILLEM DE SITTER ..... FRANK SCHLESINGER 546
JEREMIAH SMITH, JR. ..... J. H. BEALE 549
PERCY GOLDTHWAIT STILES ..... W. B. CANNON 550
MOORFIELD STOREY ..... EUGENE WAMBAUGH 552
GEORGE WOODWARD WICKERSHAM ..... J. H. BEALE 556

CARL BARUS (1856–1935)

Fellow in Class I, Section 2, 1890

The life of Carl Barus spanned the period from the time when genuine physical laboratories in this country were few and far between to the time when American physicists can hold their own with those of any other nation. His wide and intimate contacts with the development of physics in the United States both from the standpoint of governmental research and university work make his long career one of unusual interest.

Carl Barus was born in Cincinnati, Ohio, on February 19, 1856. He was the son of Carl Barus, Sr. and Sophia Möllman, both of whom came to this country from Germany about the middle of the last century. Barus attended the celebrated Woodward High School in Cincinnati, graduating with honors in 1874, a classmate of William Howard Taft.

In his school days an enthusiasm for music, literature, and scientific experiment gave early token of his later versatility. At that time the High School was more like a Junior College than the modern secondary school and Barus was exceptionally well prepared on graduation to enter the Columbia School of Mines. In the latter institution he spent but two years, having by his twentieth year decided that a pure science career was much more to his liking than the practical calling of a mining engineer. In 1876 he was invited by Rowland to come to study at the newly opened Johns Hopkins University, but largely on the advice of his father and Professor Rood of Columbia (the teacher who influenced him most during his stay in New York) he decided to go to Germany and study physics under Kohlrausch at Würzburg.

Barus spent four years at Würzburg, receiving the Ph.D. degree in 1879 and acting during the year 1879–1880 as assistant to Professor Kohlrausch. His doctoral dissertation was on the relation between the hardness and magnetization of steel, and led to a considerable amount of further investigation pursued in collaboration with the Czech physicist Strouhal. He entered with zest into the University student life, was an active member of a fraternity and fought several duels. At the same time it was in Würzburg, as he later confessed, that he first felt the all-consuming desire to devote his life to research in physical science.

In 1880 Barus was invited by Clarence King, then Director of the United States Geological Survey, to assist him in the establishment of a laboratory for the investigation of problems of physical geology. His first work in this field was the measurement of the electrical activity of ore-bodies, performed in the territory of the Comstock Lode in Nevada. After the completion of this work he removed to New York and started gathering physical laboratory equipment for geophysical research at the American Museum of Natural History. This, however, proved to be an unsatisfactory place and with his assistant, Dr. William Hallock, Barus took up residence in New Haven, in 1882. In those days physical laboratories were apt to be rather informal affairs and Barus set up his in an old dwelling house on Dixwell Avenue. With Hallock he embarked on a program of high temperature research having for its aim the calibration of platinum-iridium thermocouples in terms of air thermometers. This was distinctly pioneer work, for the whole subject of pyrometry was then in more or less confusion. Before much in the way of definite results could be obtained, the new director of the Geological Survey ordered the dismantling of the Laboratory and the removal of the apparatus to Washington.

Quarters were assigned to Barus in the National Museum, but because of the nature of the place he was unable to continue the high temperature research on the scale planned in New Haven. From 1884 to 1892 he carried out a long series of investigations on fundamental geophysical problems including the viscosity of solids, the calibration of pyrometers, the volume-temperature relations of rock as well as the temperature dependence of the specific heat of rock material. High pressure measurements also gave valuable information and the problem of the thermal conductivity of rock substance in both solid and liquid states, was attacked vigorously. This fundamental work attracted international attention, being favorably commented on by Kelvin, among others. During the same period Barus' pioneering researches on colloids were made. These have led some authorities to consider him one of the founders of modern colloid chemistry.

By a political upset Barus' tenure at the Geological Survey was terminated in 1892 and his elaborate geophysical apparatus was classified as "old junk." Fortunately the equipment belonging to

Clarence King was generously turned over to Barus and at about the same time he received an appointment as Professor of Meteorology in the U. S. Weather Bureau which had recently been remodeled. In a laboratory provided by the generosity of Alexander Graham Bell, Barus began to study the condensation of moisture by atmospheric dust particles. This promising investigation was no sooner well under way when another political storm broke over him and culminated in his dismissal. The life of a government scientist in the 90's was apparently no bed of roses, and Barus had probably too little concern with the practical exigencies of the moment.

The next eighteen months or so were spent assisting Langley in the Smithsonian Institution while the early development of the airplane was being attempted. This did not turn out well; hence for a time he tried to set up as a consulting physicist. In spite of his increasing scientific reputation he had no success in this occupation. Things looked rather blue, but the atmosphere cleared when in 1895 he received a call to succeed Professor Eli Whitney Blake as Hazard Professor of Physics at Brown University. He remained at Brown for the rest of his life.

Barus' teaching career as an active member of the Brown faculty extended from 1895 to 1926, when he retired at the age of 70. He was appointed Professor Emeritus and continued to maintain his home in Providence. He spent a large part of his time in the Physical Laboratory and to the very end of his life taught a course in Vector Analysis, a subject of which he was very fond and to the lectures in which he had devoted great care over a period of many years.

For the first twenty-five years of his teaching career Barus carried a very substantial teaching schedule, including the large introductory lecture course in general physics as well as advanced courses in theoretical physics. Though he never became an inspiring classroom teacher, preferring to follow the German custom of lectures without opportunity for discussion, he lavished great pains on the preparation of his material and corrected his students' problems with discriminating care.

Barus' interest in the general running of University affairs is manifest from the part he played in the reorganization of graduate work at Brown. In 1903 he became Dean of the Graduate Department and held this office until his retirement in 1926. His tenure of

office witnessed great growth in post graduate study at Brown University. In 1926 the Department was made into a separate school of the University. Its present status is due in no small measure to Barus' fine sense of the real significance of graduate work. His annual reports as Dean deserve to be studied carefully by all educators.

In addition to his heavy teaching and administrative duties Barus carried out a program of research which gave clear evidence of his innate mental restlessness and his insatiable curiosity. Summers which many colleagues preferred to spend in the mountains or at the seashore, were spent by him in his laboratory. Working largely by himself, fashioning his own apparatus with small assistance from a mechanician, and with little money available for elaborate equipment he yet explored a great many fields and published yearly several papers. All that can be done here is to indicate his chief fields of interest. In another place[1] it is hoped that a more detailed analysis of the significance of these researches can be given. During the first decade of the present century Barus was absorbed primarily in the study of ionization in air and the possibility of measuring it by means of the fog chamber and the coronas observed therein. This led him into a somewhat bitter controversy with C. T. R. Wilson.

The remainder of Barus' research career from 1910 on was largely devoted to the application of the interferometer to a great variety of problems, particularly in optics and acoustics. Undoubtedly the shift in the interest of physicists contributed somewhat to the neglect of Barus' later papers. Many if not most of his later publications were in the nature of progress reports and possibly not enough attention was paid to the organization in the simplest form of the essential results. Moreover, although Barus read scientific literature very widely and was well acquainted with the work of other investigators, he nevertheless remained an individualist and preferred to work out his own ideas in his own way. As was doubtless to be expected this individualism became more marked with his advancing years.

When one considers the inadequacy of the means at his disposal compared with those of many of his earlier contemporaries, to say nothing of the equipment which the twentieth century physicist expects without question, Barus' experimental ingenuity can only be

[1] In a notice for the American Physical Society.

characterized as remarkable and the number of problems attacked as well as the total amount of research done as stupendous. The list of his publications from 1879 to 1926 comprises over 400 items, most of them papers and memoirs of substantial length.

Honors came to Carl Barus in generous measure and his memoirs indicate that he deeply appreciated the recognition of his work by fellow-scientists. Only the most significant of these honors can be mentioned here. He was elected a Fellow of the American Academy in 1890. This was followed by election to the National Academy of Sciences in 1892; he was one of the youngest men who had been chosen up to that time. In 1899 Barus collaborated with a group of other notable American physicists, including Ames, Michelson, Magie, B. O. Peirce, Pupin, and A. G. Webster, in the launching of the American Physical Society. In 1905 he became its fourth president and remained a member of the council until his death. In 1900 the Rumford medal of the American Academy was awarded to him. He was an honorary member of the Royal Institution of Great Britain and of the First and Second International Congresses of Radiology and Electricity in Brussels. Brown University gave him the LL.D. degree in 1907 and the same honor was conferred by Clark University in 1909. During the Great War he was a member of the first National Research Council called into being to advise the United States government.

In 1887 Barus married Annie Gertrude Howes of Boston. They had two children, Maxwell Barus and Deborah Barus of New York and Boston respectively. Mrs. Barus died in 1928.

Professor Barus died on September 20, 1935. Although he had suffered at times from insomnia, doubtless connected with his incessant mental activity, his physical condition had been good up to the summer of 1935. The end came suddenly in the form of a cerebral hemorrhage.

It is impossible to close this brief account without some mention of Barus' personal characteristics and his widely diversified interests. As a former student I can testify to his dignified sternness in the lecture room, a severity that was to be sure relieved by frequent flashes of wit. Personal acquaintance soon brought out the essential geniality of his temper. He was a delightful conversationalist and his accurate memory of the details of a wide experience will long be

remembered by those who were privileged to hear his reminiscences. His interest in music led him to a considerable mastery of half a dozen instruments. He also composed some 40 instrumental pieces. Barus was a reader of very wide though cultured tastes. His own writings show marked literary ability. To the last he retained a lively interest in current affairs. In every respect he was a gentleman of the old school, one of the ornaments of American science.

R. B. LINDSAY.

WILLIAM KEITH BROOKS (1848–1908)

Fellow in Class II, Section 3, 1892

William Keith Brooks was a zoölogist preëminent for his contributions to philosophical morphology. He was born at Cleveland, Ohio, March 25, 1848, and died at Baltimore, November 12, 1908. His parents were Oliver Allen Brooks and Ellenora Kingsley, both of New England ancestry. From the public schools of Cleveland he entered Hobart College and after two years transferred to Williams College, where he distinguished himself in mathematics, was elected to Phi Beta Kappa, and graduated A.B. in 1870. After a brief period in business with his father, he took up teaching at a school for boys, De Veaux College in Niagara Falls. Undecided at first whether to specialize in mathematics or in Greek, he turned finally to his old love—natural history—and entered Harvard as a graduate student under Louis Agassiz, spending the summer of 1873 with him at the new laboratory on the island of Penikese in Buzzards Bay, an experience that largely shaped his future both in teaching and in research. In the summer of 1874, Brooks was again at Penikese, then directed by Alexander Agassiz. He was admitted to the degree of Doctor of Philosophy at Harvard in 1875. During the ensuing summer vacation Brooks with two other young men organized a class for laboratory instruction in zoology and botany free of charge, having secured the high school building in Cleveland for that purpose. Their instruction included out-door study and collecting on lake and river. Later in the summer he was employed as a tutor by Mr. Agassiz, in whose private laboratory at Newport he studied the development of several marine gasteropods and, with living material, began the work on Salpa that he was to continue off and on during the rest of his life.

Afterward he was Assistant to Alpheus Hyatt in the Museum of the Boston Society of Natural History, where he made models of mollusks and anatomical preparations to be exhibited with them.

The Johns Hopkins University was opened in 1876 and twenty fellowships were announced. Brooks's application for one of these crossed in the mail a letter from the University offering him the position of Associate in Biology under Professor H. Newell Martin. At the meeting, that summer, of the American Association for the Advancement of Science, Brooks outlined a theory of heredity in which he introduced the important concept of the *continuity of the germ-cells* to explain ancestral heredity, while accepting Darwin's pangenesis as an attempt to explain variation. (*Am. Nat.* **9**, 144–7, 1877.) This was elaborated in his book, "The Law of Heredity," 1883. Brooks and Miss Amelia Katherine Schultz were married in Baltimore in 1878. That summer he organized, as a branch of the Biological Department, the Chesapeake Zoological Laboratory at Fort Wool near Old Point Comfort, the second marine laboratory for advanced zoology in this country. Nearly every summer thereafter found him at the seaside—at Crisfield and Hampton on the Chesapeake; at Beaufort, N. C.; Abaco and Nassau in the Bahamas; Woods Hole; Jamaica; the Tortugas. He was made Associate Professor of Morphology in 1883, advanced to Professor in 1889, and in 1894 succeeded Martin as head of the Department of Biology.

The three papers by Brooks in the report of the first session of the Chesapeake Laboratory are prophetic of his future work. In one he describes the development of the larva of Lingula, the most primitive type of living brachiopods, in another he discusses certain early stages in the embryo of gasteropod mollusks, and in the third he gives the first account of consecutive stages in the metamorphosis of the larva of a known species of stomatopod crustacea. The last mentioned paper brought him an invitation to examine the extensive collection of Stomatopoda obtained by the Challenger Expedition, and the resulting Report (1886) is not merely a masterpiece of systematic zoölogy, but a treatise on the morphology of the group including the larval forms, in which he discovered a simple numerical law of increment in size at each successive stage (pp. 5 and 105).

The laboratory was located during its second summer at Crisfield, a centre of the oyster industry; Brooks having been requested by the

Maryland Fish Commissioner to study the development of the oyster. The result was the discovery that, unlike the European form, the eggs of the American oyster are fertilized outside the body; and by mixing eggs and sperm Brooks obtained embryos that he was able to rear through all stages to the formation of the shell. His book, "The Oyster," 1891 (Ed. 2, 1905), became the standard work on the subject and the one by which he is most widely known.

It is, however, his great monograph on "The Genus Salpa," 1893, that is most typical of Brooks. He was fascinated by the extraordinary history of the germ-cells and the complex development of these exquisitely transparent barrel-shaped animals that swim the warmer seas in alternating generations of single individuals and individuals united in long chains. The monograph gives detailed accounts of the development of both the solitary and the chain forms, illustrated by many plates of the author's own beautiful drawings. These are followed by a discussion of the origin of the Chordata, with charming descriptions of life in the ocean, and a defense of the thesis (p. 163) that, "Most of the great metazoic stems show by their embryology that they run back to simple and minute pelagic ancestors, and that their common meeting-point must be projected back to a still more remote time, before the differentiation of their pelagic ancestors had been affected." This philosophy of evolution, at the base of much of his work, is discussed, together with other topics, by Brooks in his "Foundations of Zoology," 1899, a series of lectures notable for their broad philosophical outlook, for which the author freely acknowledges his indebtedness to the works of George Berkeley and of Charles Darwin.

Brooks produced but one text-book, the "Handbook of Invertebrate Zoology," 1882, an excellent manual unfortunately allowed prematurely to go out of print. His lectures on zoölogy to undergraduates were clear and entertaining, illustrated by specimens and by rapid sketches on the blackboard. That they were delivered without notes and with little or no preparation, amazed his assistants until they realized that his examples were drawn mainly from his own investigations. Like Agassiz, Brooks allowed his graduate students to work largely upon their own initiative; but at the weekly meetings of the Seminar and of the Journal Club, and especially at the delightful Thursday evenings at "Brightside," where the reading

and discussion of biological classics were followed by simple refreshments and rounds of games with Mrs. Brooks and the two children, these graduate students received an inspiration and a feeling of kindly interest and sympathy that they never forget. The success of Brooks as a teacher may be gauged by the long list of his students who have held prominent positions in the great universities and colleges of the country.

For more complete accounts of the life and work of Brooks and of his personal characteristics, the reader is referred to Conklin, *Nat. Acad. Sci., Biogr. Mem.* **7**, 23–88 (1910) and to the Memorial Volume, *Jour. Exp. Zool.* **9**, 1–52 (1910), which contains also a complete bibliography.

R. P. Bigelow.

WILLIAM ELWOOD BYERLY (1849–1935)

Fellow in Class I, Section 1, 1878

Byerly was born, of Quaker stock, in Philadelphia, but he grew up in Orange, New Jersey, where he was prepared for college by private tutors. In Harvard he was a member of the Class of 1871, and among his class-mates were Ephraim Emerton, William Lawrence and Henry Cabot Lodge. To use an old phrase, which meant something rather definite when elective studies were few in the college curriculum, Byerly "led his class" in scholarship.

After two years as a graduate student at Harvard, he received, in 1873, the degree of Ph.D. in mathematics. One other man was given the same degree, in another subject, at the same time. This was the beginning of an educational epoch at Cambridge, for Harvard had never given the Doctorate of Philosophy before.

Byerly then went at once to Cornell University, where he was Assistant Professor of Mathematics for three years. He returned to Harvard as Assistant Professor in 1876. In 1881 he became Professor and in 1905 was made Perkins Professor of Mathematics, succeeding the late James Mills Peirce in that position. In 1913, being threatened with blindness, he retired from teaching and was made Professor *Emeritus*.

His published works are *Elements of Differential Calculus* (1879), *An Elementary Treatise on Fourier Lines* (1893), *An Introduction to*

Generalized Coordinates (1916), and *An Introduction to the Calculus of Variations* (1917).

Byerly was a masterly teacher, both in person and through his books. He loved the work of teaching and he won the grateful appreciation of his students. Original work in mathematics he hardly undertook, though his colleague B. O. Peirce, a man well qualified to judge of such matters, believed he could have distinguished himself in such work if he had chosen to do so.

He was one of the first to join actively in the Cambridge movement for the higher education of women, which led ultimately to the establishment of Radcliffe College. He taught classes of women for ten years, and for a very much longer time he was deeply engaged in the administrative work of Radcliffe, as the official representative of Harvard in the academic relations of the two institutions. President Eliot said of him in 1913 "He has been the most indispensable person connected with the growth and development of Radcliffe College." The recently constructed chemical and physical laboratory building at Radcliffe is named in his honor, Byerly Hall.

Byerly was twice married. First, in 1885, to Miss Alice Parsons of Boston, by whom he had two sons, Robert Wayne, now a lawyer in New York City, and Francis Parkman, now a public accountant living near Philadelphia. Mrs. Alice Parsons Byerly died in 1918. In 1921 Byerly married Mrs. Anne Carter Wickham Renshaw of Virginia, who survives him. He lived in Swarthmore, Pa., during his later years and he died there, though his address in *Who's Who* was always given as Cambridge.

Byerly remained all his life a Quaker, in his love of quiet, in his immunity from popular excitements, and in his serene devotion to the things that seemed to him most worthwhile. He was pre-eminently a thoughtful man. He did not do or say heedless things. In fact, his friends sometimes complained that he was always right. He was steadfast in his few intimate friendships and in all his ways of life. For more than fifty years, with one exception, he went to Southwest Harbor, Me., every summer. His very last summer was spent there.

In his college days he excelled in certain forms of gymnastics, and in his later life he was fond of athletic sports, riding, tennis, golf, canoeing, and yachting, for diversion and exercise. He was never

an athletic "fan," and it is doubtful whether he ever attended a great football or baseball game. The noise and fury of such exhibitions would no doubt have offended his Quaker instincts. Nevertheless, the spirit of emulation was by no means lacking in him; whenever he engaged in any contest he took the matter seriously and did his best to win.

He was an able all-around man, a strong but kindly character, and he had a distinguished, effective, useful life.

EDWIN H. HALL.

GILMAN ARTHUR DREW (1868–1934)

Fellow in Class II, Section 3, 1915

Gilman Arthur Drew was born in Newton, Iowa, November 15, 1868; he died in Eagle Lake, Florida, October 26, 1934. His active life was devoted to the study and advancement of zoölogy, as teacher, investigator and administrator.

He graduated from the University of Iowa in 1890 with the degree of B.S. A year of teaching was followed by a year of graduate work at Johns Hopkins University; then back to teaching. In 1892 he married Lena Slawson of Newton, Iowa, who survives him. From 1896 to 1900 he was again at Johns Hopkins, first as a student of William Keith Brooks, and later as his assistant. He received the degree of Doctor of Philosophy there in 1898 for his fine work on Yoldia limatula. During part of his residence at Johns Hopkins University he held the Adam T. Bruce Fellowship. In 1900 he was appointed Professor of Biology in the University of Maine. From 1901 to 1909 Drew was in charge of the course in Invertebrate Zoology at the Marine Biological Laboratory, Woods Hole, Massachusetts, and contributed greatly to the high reputation that this course has always possessed. As a result of this experience he published a Manual of Invertebrate Zoology which has been widely used in American Laboratories. He was appointed Assistant Director of the Marine Biological Laboratory in 1909, at first on a part time basis; but in 1911 he resigned from the University of Maine to devote his entire time to this position. Ill health forced his resignation in 1926, after exactly a quarter of a century devoted to this Laboratory. The remainder of his life was spent on his citrus ranch at Eagle Lake, Florida.

Drew was an outstanding personality in many ways. Although lame and obliged to use a crutch from childhood, he was physically strong, vigorous and active. In character he was unselfish, conscientious, of strong convictions, and uncompromising on major issues; he enjoyed the confidence of all, and the affectionate regard of many friends. His election as President of the American Society of Zoologists in 1920 testifies to the respect of his colleagues.

Although much occupied with teaching and administrative duties Drew never lost his interest in research, and he continued his publications up to 1919; after which the increasing pressure of administrative work combined with decline of health limited his scientific activities. His publications were not numerous, but they were invariably of high quality. He had the mind of a naturalist; though not a taxonomist he limited his serious studies to molluscs; he combined studies of anatomy, behavior and embryology in gaining a total view of the life history of the species under consideration. The best example of this is his study of the breeding behavior and breeding mechanisms of the squid, Loligo, one of the most finished and complete studies of reproduction in any invertebrate. (This work is more fully outlined in my biographical note in "Science" 80, 470–71, 1934.)

But perhaps Drew's greatest contribution to the zoology of his time came through his devotion to the upbuilding of the Marine Biological Laboratory as a station for biological education and research. He was devoted to the principles of coöperative endeavor and democratic management that characterize this institution. He had a veritable flair for organization of services and for development of conveniences, which extended to all branches of the work, whether the organization of accounting, the management of the "Mess" and dormitories, the work of the Supply Department at sea or on land, design of facilities for the work of investigation in the laboratories, design of the permanent laboratories erected in 1913 and in 1924, and supervision under the architects of their construction. He devoted to all of these services the same careful thought, the same knowledge of detail and the same patience that he gave to his scientific investigations. The result has been a contribution to biological research that will last as long as these stout buildings shall endure. They should be regarded as a monument to his memory.

FRANK R. LILLIE.

EPHRAIM EMERTON (1851–1935)

Fellow in Class IV, Section 2, 1901

Ephraim Emerton, a pioneer in the teaching of Mediaeval history in America, died at his home in Cambridge on March 3, 1935, in the eighty-fifth year of his age. Born at Salem, Mass., Feb. 18, 1851, the son of James and Martha (West) Emerton, he prepared for college in the Salem High School, and entered Harvard at the age of 16. His record there was satisfactory, but not remarkable. After graduating in 1871 he spent a year at newspaper work, a year as secretary to the Mayor of Boston, and a year of travel in Europe. For three years thereafter he studied history, political science, and philosophy in Leipzig and Berlin and took his Ph.D. at Leipzig in 1876. His thesis lay in the field of diplomatic history. In Germany he discovered what real mastery of his subject meant.

On his return to America he was appointed to an Instructorship in German and History at Harvard; two years later he dropped the German, and in 1882 he became the first occupant of the Winn Professorship of Ecclesiastical History. For 36 years he enjoyed the privilege of this chair to steep himself in Mediaeval History and to teach it to students both of the Faculty of Divinity and of Arts and Sciences. Text-books were lacking and Emerton provided them not only for his own classes but for most of the Universities of America. His "Introduction to the Study of the Middle Ages," reprinted ten times between 1888 and 1916, was a model of its kind and still retains its usefulness. In his undergraduate days instruction in history consisted substantially of recitations from text-books. Emerton broke completely with this method. He put in the centre of his undergraduate teaching his own lucid, idiomatic, argumentative expositions. In his most advanced course, entitled with characteristic modesty and precision Practice in the Study and Use of Materials for Church History, he introduced his students directly to the sources. If Henry Adams inaugurated the seminary system in America Emerton established it.

He was not an organizer and distrusted coöperative research; yet he was one of the original group which founded the American Historical Association and we are told that "to him, more than to any other man, goes the credit of having laid the foundations" on which later the Mediaeval Academy of America was built. In his earlier

years he wrote general histories of the Middle Ages; in his middle years he made his original contributions to learning in works on Erasmus, Marsiglio of Padua, and Humanism and Tyranny in the Middle Ages; in his later life he made translations—of the Letters of Gregory VII and of Boniface, the apostle of Germany. A labor of love and at the same time a *testimonium animae* was his sober dispassionate book on "The Unitarian Faith."

Unhurried and outwardly unruffled, shrewd in business, studiously unenthusiastic, detached in manner though not in spirit, for he was preëminently a friendly man, he worked quietly on to the end with mental and physical powers unimpaired. In his will he left to his alma mater a legacy of some $60,000 for the furtherance of advanced work in history.

W. S. Ferguson.

ADOLF ENGLER (1844–1930)

Foreign Honorary Member in Class II, Section 2, 1901

Heinrich Gustav Adolf Engler was born March 25, 1844 in Sagan, Lower Silesia, Germany. His father, August Engler, was a merchant; but owing to business difficulties he soon separated from his family, and the mother, Pauline, née Scholtz, moved in 1848 with the boy to Breslau where she lived in very moderate circumstances. Engler, after some years in the public school, entered the Magdalen Gymnasium, a well known classical higher school from which he graduated in 1863. During that time he developed great interest in the natural sciences and collected animals, plants and minerals, but showed special interest in the plant world and took great pleasure in the botanical excursions he made in the plains and mountains of Silesia. Through these excursions, he became acquainted with several well known botanists, and when he entered the University of Breslau at the age of nineteen, he had already a thorough knowledge of the native flora.

At the University he could pursue his botanical studies under H. R. Goeppert and Ferdinand Cohn, both authorities in their special fields, who became interested in Engler and furthered his studies also outside the classroom. As subject for his doctor's thesis, Engler selected the genus Saxifraga and obtained in 1866 with his disserta-

tion, *De genere Saxifraga L. pars I et II*, written in Latin, the degree of Doctor of Philosophy. Part III containing phytogeographical observations on the genus was published the following year. After passing his examination for the doctorate, he obtained a position as teacher in the same school from which he had graduated nearly four years before. He remained there until 1871, when Professor Naegeli, director of the botanical institutions at Munich, on the recommendation of A. W. Eichler, offered him a position as custos of the botanical collections. Here he found the opportunity to do intensive taxonomic and phytogeographical work. He published his monograph of the genus Saxifraga in 1872 and became collaborator of Martius, *Flora brasiliensis*, and later of De Candolle's *Monographiae Phanerogamarum;* for the former publication he wrote the families Escallonieae, Cunoniaceae, Olacineae, Icacineae, Zygophylleae, Rutaceae, Simarubaceae, Burseraceae, Ochnaceae, Anacardiaceae, Sabiaceae and Rhizophoraceae, and for the latter he wrote the monographs of Araceae, Burseraceae and Anacardiaceae. He also held a position as lecturer at the University.

In 1874 he married Marie Firle of Breslau; they had one son and one daughter. Engler remained in Munich until 1878 when the position of professor of botany at the University of Kiel was offered to him on the recommendation of Eichler, who was called to Berlin. Here he wrote his important work *Versuch einer Entwicklungsgeschichte der Pflanzenwelt*, in which he used the results of the paleontological studies of Heer and Saporta to explain the phylogenetic development and the present distribution of plants. He also founded in 1880 the *Botanische Jahrbücher* intended chiefly for systematic and phytogeographical publications, of which he remained editor until his death. He left Kiel in 1884 to become professor of botany and director of the botanic garden at the University of Breslau as successor of his former teacher Goeppert. Here it was his task to reorganize and modernize the botanical institute and the garden; in the garden he planned and laid out phytogeographical groups to show certain plant formations of the temperate zone. In 1887 he began to edit with a large staff of contributors, the monumental work *Die Natürlichen Pflanzenfamilien* of which Karl Prantl edited the Cryptogams. It was finished in 1899 and supplements were published up to 1911. A new edition was started in 1925; it is much more uniform in its treatment of the different families.

Engler did not remain long in Breslau, for in 1889 he was called to Berlin as Professor of botany and director of the botanic garden, the largest in Germany, to fill the chair vacated by the death of Eichler about two and one-half years before. Here the work on the Pflanzenfamilien progressed more rapidly, because of the much larger staff of the different botanical institutions in Berlin, which permitted most of the work to be done in Berlin under Engler's direct supervision. In 1892 he published under the title *Syllabus der Vorlesungen über spezielle und medizinisch-pharmazeutische Botanik* a condensed representation of the system used in the *Natürlichen Pflanzenfamilien;* many revised editions under the title *Syllabus der Pflanzenfamilien* were published and helped to make Engler's system which was based on phylogenetic principles popular and accepted in many important taxonomic publications.

Large collections of African plants made by many German collectors and expeditions in tropical Africa chiefly in German colonies, turned Engler's attention to the study of the African flora. He published in 1892 *Die Hochgebirgsflora von Afrika,* in 1895 *Die Pflanzenwelt Ostafrikas und der Nachbargebiete,* and from 1908 to 1925 *Die Pflanzenwelt Afrikas,* all three important contributions to the phytogeography of Africa. Most of the taxonomic contributions to the African flora were published from 1891 to 1929 under the title *Beiträge zur Flora von Afrika* in the *Botanische Jahrbücher.* Engler himself visited Africa three times, in 1902, in 1905 when he extended his tour to India and Java, and in 1913; in that year shortly after his return to Berlin, he went on a tour around the world, travelling through Siberia to Japan and returning by way of America; on that occasion he also paid a visit to Boston. His great interest in phytogeography and phytogeographical problems induced him to start in 1892 with Drude a collection of phytogeographical monographs under the title *Die Vegetation der Erde,* of which until now fifteen volumes have been published.

His great talent for organization and his capacity for work found full expression in the planning and the creation of a new botanic garden and museum in Berlin-Dahlem, to replace the small and crowded botanic garden which had become surrounded and hemmed in by the city. In this undertaking started in 1895 and practically finished in 1910, his experience in the reorganization of the botanic

gardens and botanic institutes in Kiel and Breslau was of great help to him. He was particularly interested in the phytogeographical groups of the garden intended to illustrate plant formations and the geographical distribution of plants in the northern hemisphere; he himself designed detailed plans of these groups and made the selection of the plants to be used.

In 1921 he became professor emeritus and resigned from his position as director of the garden and museum, but he retained his office in the museum and remained editor of the *Botanische Jahrbücher* and the *Pflanzenreich;* he continued his literary activity until his death which came peacefully on the morning of October 10, 1930, at the age of eighty-six years.

Engler was without doubt one of the leading botanists in the fields of phytogeography and taxonomy during the last quarter of the nineteenth and the first quarter of the twentieth century, and has exerted a far-reaching influence on these two branches of botany. In recognition of these services to science, many honors were bestowed upon him; from four universities he received honorary degrees; he was honorary member of many academies and societies and corresponding member or member of numerous other societies; his own government honored him by titles and decorations. Many genera: Englerastrum, Englerella, Engleria, Englerina, Englerocharis, Englerodaphne, Engelerodoxa, Englerophoenix, Englerophytum and numerous species of plants have been named in his honor and will perpetuate his name in the plant world.[1]

ALFRED REHDER.

EDWIN BRANT FROST[2] (1866–1935)

Fellow in Class I, Section 1, 1913

Edwin Brant Frost was born on July 14, 1866, at Brattleboro, Vermont. It was here or in the immediate neighborhood that most of his forbears for several generations had lived and flourished. The first of the name in this country was Edmund Frost, who came to Boston in 1634. Edwin was the second son of Carleton Pennington

[1] For a more detailed biography with a complete bibliography of his publications see *Botanische Jahrbücher*, LXIV. i–lvi (1931); also *Berichte der Deutschen botanischen Gesellschaft*, XLVIII (146–163), both with portraits.

[2] Abridged from *Science*, Volume 81, No. 2112, p. 605.

Frost (1830–96), who practiced medicine in Brattleboro and neighboring towns until 1871, when he moved with his family to Hanover, New Hampshire, there to be a professor in the Dartmouth Medical School and afterwards dean of the school and a trustee of the college.

Edwin was graduated A.B. at Dartmouth in 1886. The year following he continued postgraduate work at Dartmouth, taught school in a nearby village, and at the end of the year, spent a few months at Princeton, where he came under the influence of Charles Augustus Young (1834–1908). Three years later he secured a two-years leave to visit most of the European observatories and to spend a year at Potsdam in Germany, where Vogel was establishing an observatory devoted especially to the new science of astrophysics and where he had gathered around him an exceptionally brilliant staff. Frost thus had an opportunity to come into contact with a group that it would have been difficult to match at a single institution either in that day or during the twenty years to follow. When he returned to Dartmouth in 1892 it was as assistant professor, and this promotion was followed in 1895 (when he was only twenty-nine years of age) by a full professorship and the directorship of the Dartmouth Observatory.

While at Potsdam Frost made arrangements with Scheiner to translate into English the latter's *Spectralanalyze der Gestirne* (1891). Frost's translation played an important part in the rapid development of the science in this country, and until very recently it remained the standard work on the subject in our language.

In 1897, Dr. George E. Hale, director of the recently completed Yerkes Observatory at Williams Bay, Wisconsin, successfully applied to Miss Bruce for a grant sufficient to set on foot an extensive program of spectroscopic observations of the stars. It was under these auspices that Professor Frost took up his duties at Williams Bay in the summer of 1898, expecting to stay for five years only. But before the end of this term Hale had organized what was at first an expedition from the Yerkes Observatory to California to observe the sun under more favorable climatic conditions. As everyone knows, this expedition grew into the Mount Wilson Observatory. In the two years following 1903 much of the responsibility for the conduct of the Yerkes Observatory fell to Frost. On Hale's resignation as director in 1905, Frost was appointed to succeed him in June of that year.

Frost was distinctly a specialist devoting his energies to the spectroscopy of "early-type" stars to the practical exclusion of every other subject. Primarily for this purpose the Bruce spectrograph was constructed in 1900 largely from his specifications and under his supervision. With this instrument he measured the radial velocities of many B-type stars and discovered their most important characteristics. It was shown that their velocities are small as compared with those of later-type stars and that there is a slight but unmistakable tendency for these stars apparently to recede from our system as a whole, as if they formed an expanding group. These facts were later more fully developed by Campbell.

Frost also showed from changes in radial velocity that a surprising number of B-type stars are close binary systems, perhaps as many as one in every three. On several occasions I have witnessed his discovery of such a binary from a single photograph of its spectrum. This sounds like an impossibility, but the explanation is simple. Even in those days (around 1904) he was extremely nearsighted, and could see well an object not more than an inch from his eye; thus, as he used to say, by simply pushing his glasses up he always had at his disposal a magnifying power of about ten diameters. After he had secured a spectrogram and developed it the next morning, he would examine it in this way, sometimes before it was dry. If he saw the lines considerably displaced from their normal positions, he knew that it was extremely unlikely that this was because of the star's large space velocity, since, as we have said, he had found that such velocities are always small for B-type stars; the displacements must then be due to orbital motion, and so indeed they invariably proved to be when later he could examine a series of plates of that star.

Frost's place in astronomy is not to be judged on the basis of his researches alone. We have already mentioned his translation of Scheiner's wotk and the part this translation played. For more than thirty years his was the chief responsibility for editing the *Astrophysical Journal*, "an international review of spectroscopy and astronomical physics," founded in 1895 by Hale and Keeler, and now in its eighty-first semi-annual volume. One might say of Frost as Frost used to say of Burnham, "he is the best skeptic I know." As a result of this quality of judicious conservatism, the *Astrophysical Journal* has had little to regret in the way of hasty or ill-advised publication. In addition, he had an unusually sensitive feeling for language.

The last years of his life form a sad story, but an inspiring one as well. From early childhood he had had trouble with his eyes. This became acute by 1907 and necessitated long periods of complete rest for his eyes. In 1915 the retina in one eye became detached and within a few months he completely lost the sight in this eye, never to regain it. A few years later a cataract began to form in his other eye and grew worse and worse, until he became totally blind. In spite of this heavy handicap, he managed for several years to continue his work as director of the observatory, but finally felt compelled to retire in 1933. In all his years of complete darkness he never lost his sense of humor. To the last he had a way of ignoring his blindness in conversation and whimsically using terms and expressions that one would ordinarily expect only from those who can see.

He lived to enjoy his retirement less than two years, dying on May 12, 1935, after an operation for gallstones.

He was elected a member of this Academy in 1913. Among other honors that came to him were degrees from Dartmouth and Cambridge; membership in the National Academy of Sciences and in the American Philosophical Society; honorary membership in astronomical societies in England, Italy, Mexico, Canada and Russia.

Frost was married in 1896 to Mary Hazard of Boston; she and their three children survive him.

FRANK SCHLESINGER

RICHARD BURDON HALDANE (1856–1928)

Foreign Honorary Member in Class III, Section 1, 1928

Richard Burdon Haldane, Viscount Haldane of Cloan, lawyer, judge, statesman and philosopher, was born July 30, 1856, in Perthshire, Scotland. His father was a writer to the signet, the Scotch equivalent of solicitor in England, or attorney as we say in the United States. He was educated at Edinburgh, where he took first class honors in philosophy, and at Göttingen, where he studied philosophy under Lotze. He went to London and was called to the bar in 1879, becoming Queen's Counsel in 1890. Going into politics as a Liberal, he became Member of Parliament for Haddingtonshire in 1885 and held the seat continuously till 1910. In 1905 he became a member of the Liberal government as Secretary for War and made his mark in

administration by reorganizing the British army in the face of strong opposition, so that it became adequate to the exigencies of the World War. He is now recognized as one of a handful of great war ministers in English history. In 1918 he was chairman of the Committee on the Machinery of Government which made a notable report indicating the changes of organization demanded by social and economic conditions of the day. In 1925 he became a member of the "Committee of Civil Research," for the continuous organization of knowledge as to the policies of government.

In 1911 he was raised to the peerage and made a member of the Judicial Committee of the Privy Council—the appellate tribunal for the British dominions and colonies—and in 1924 became Lord Chancellor, the head of the British judiciary. As a judge he was no less distinguished than as a statesman. He won the respect of the English-speaking world for the Privy Council as a universal court of appeal for the Dominions and Colonies, when it seemed fated gradually to lose its jurisdiction.

He made no less a mark in education. In 1910 he was chairman of the Commission on University Education in London, and the fruits of his work on that commission were notable. He was the first Chancellor of Bristol University and was Lord Rector of the University of Edinburgh. He was active also in the Workers' Educational Association and did much to promote its usefulness.

Perhaps his most enduring work was in philosophy. In 1903 he delivered the Gifford lectures at St. Andrews, afterward published under the title of "The Pathway to Reality," in which he sought to restate Hegel in the light of recent science. In 1921 he published "The Reign of Relativity," a study in science and metaphysics, and in 1922 "The Philosophy of Humanism." These books, which would have been remarkable in a teacher of philosophy, are the more remarkable coming from a judge and statesman, active in each capacity.

In 1913 Lord Haldane visited America and delivered the annual address at the meeting of the American Bar Association at Montreal. He made the acquaintance of a number of American legal scholars at that time and kept up an interesting correspondence with them during the rest of his life.

Thus Lord Haldane was great in four capacities, as statesman, as judge, as educator, as philosopher. He saw clearly, adhered firmly

to his principles, and made his practical philosophy effective in action to bring about lasting results in the army, in law, in industry, and in education. He died August 19, 1928.

ROSCOE POUND

ALBERT SPEAR HITCHCOCK (1865–1935)

Fellow in Class II, Section 2, 1925

Albert Spear Hitchcock, student of grasses, was born at Owasso, Michigan, on September 4, 1865, and died on December 16, 1935, while returning from Europe with his wife on board the steamship City of Norfolk. His boyhood was spent in Nebraska and Kansas, and in 1884, at the age of nineteen he graduated from Iowa State Agricultural College, where he had been much under the influence of Professors Charles E. Bessey and Herbert Osborn. At first divided between chemistry and botany he soon (in 1886) became instructor in chemistry at Iowa State University, resigning in 1889 to become assistant at the Missouri Botanical Garden. In 1892 he was appointed professor of botany at the Kansas State College, and in 1901 took up government work at Washington, as Assistant Chief of the Division of Agrostology, in 1905 becoming Systematic Agrostologist.

Hitchcock's first publication (in 1891) was a catalogue of the local flora of the region surrounding the college he had attended, at Ames, Iowa, attesting his boyhood interest in the flora. This was followed in 1894 by similar studies of the flora about Manhattan, Kansas, where he was teaching, but the work there, in the Experiment Station, resulted in a more economic trend in such studies as those on the corn smut, weeds, and weed-roots. When he transferred to Washington and was put in charge of some of the economic applications of botany, such as the control by planting of movements of sand dunes, he more and more devoted his studies to the cultivated and wild grasses. By 1905, when he took charge of the grass herbarium of the Department of Agriculture, he had become one of the chief students in the country of this complex and highly important group. From then on he was essentially a specialist on grasses, and 80 of his 150 published papers and volumes dealt exclusively with that group.

With taste and opportunity for travel Hitchcock visited and collected in America from Labrador to Alaska and Chile and in Hawaii,

the Philippines, Japan, China, Indo-China and South Africa; and he was returning from the International Botanical Congress at Amsterdam at the time of his death. Democratic and enthusiastic, Hitchcock made friends wherever he went and took active part in the deliberations of national and international organizations. Keenly interested in the reconciliation of differences in practice and theory in plant nomenclature, he vigorously prosecuted his work on various legislative committees on this baffling and ever-present aspect of botany. Realizing that the final identification of the American grasses which had been early described by European students rested upon exact understanding of the actual specimens or types which had been before the original author, he set himself and his associates the important task of personally examining these original specimens in the old herbaria and museums of Europe. As a result, he assembled at Washington drawings, photographs, memoranda and often identifiable fragments which are and always will be invaluable authentic implements for workers on American grasses.

As already noted, Hitchcock's publications on his chosen group were many. The last (except for posthumous works), a *Manual of the Grasses of the United States*, issued slightly more than a year before his death, is the most voluminous. Besides the main body of text, which will long be standard in this country, it contains more than 200 pages of synonymic citations, based upon the personal studies and interpretations of the author and his associates. The assembling of this vast bibliography was, in itself, a task of years. Its usefulness to future students is inestimable.

To those who knew Hitchcock personally, he was a lovable and unassuming man, a kindly friend of every one, with unlimited enthusiasm and earnestness. To the student of systematic botany who knew only his work, he was a tireless and productive student of a technically difficult and to many botanists quite uninteresting group of plants, the grasses. His contribution to our understanding of this economically most important family of plants has been unequalled in America. His contribution of unpublished notes and specimens, preserved at Washington, will be invaluable to future workers.

MERRITT L. FERNALD

ALBERT ANDREW HOWARD (1858–1925)

Fellow in Class III, Section 2, 1906

Albert Andrew Howard was born in Palmer, Massachusetts, on October 6, 1858. He prepared for college at Phillips Exeter Academy and went thence to Harvard College; from this institution he graduated *magna cum laude* in 1882, having distinguished himself as an undergraduate by his proficiency in the ancient classics. He proceeded immediately to Leipsic and engaged there in advanced studies in Latin. Deciding to seek the degree of Doctor of Philosophy in the ancient classics at his alma mater, he returned to Harvard in 1883 and in 1885 he secured the degree.

After a brief period of teaching in a private school, he passed to the University of California and there occupied the post of Professor of Latin from 1888 to 1890. In the last mentioned year he was recalled to Harvard, where he remained up to the time of his death on July 31, 1925, holding in succession the titles of Tutor in Latin, Assistant Professor of Latin, Professor of Latin, and Pope Professor of Latin.

In the field of Latin and its literature, Professor Howard showed himself a man of varied interests. He was skilled in palaeography and in historical and descriptive Latin grammar. He studied the public life of the Romans very assiduously and published texts relating thereto as a help to classroom investigation of the subject. During many years he applied himself to every detail of the works of Suetonius; had he lived longer, he might have carried out his announced purpose of issuing a new and thoroughly critical edition of that famous Roman historian. In conjunction with his colleague, Professor C. N. Jackson, he issued an *Index Verborum* of Suetonius, which will long be helpful to all who engage in research on that writer.

Music had great charms for Professor Howard and he was very familiar with the musical instruments used in ancient Greek and Roman times. Because of his knowledge of the history of music in general, he was asked by the widow of Professor J. K. Paine to edit the latter's *History of Music* and he achieved this task very successfully. After the death of his colleague, Professor M. H. Morgan, he completed that scholar's translation of the work of Vitruvius and saw it through the press.

Howard was not only a solid scholar addicted to research and the

publication of its results, but an inspiring and much loved teacher in the classroom. He had ample means and took delight in helping financially needy and deserving students. After his death, Mrs. Howard, to whom he was married on July 1, 1884, established as a memorial of his labors the Albert and Anna Howard Fellowship, which, with an annual stipend of $1200, is awarded to advanced students dealing with any phase of the ancient life of the Greeks and Romans. Besides his widow he left one son, Hermann Hagen Howard.

J. D. M. FORD

JOSEPH JACQUES CÉSAIRE JOFFRE (1852–1931)

Foreign Honorary Member in Class I, Section 4, 1919

Joseph Jacques Césaire Joffre, the future Marshal of France, victor of one of the greatest battles known to history, savior of the western world from German domination, was born on January 12, 1852, in the small village of Rivesaltes in the Pyrenees, the son of Gilles Joffre, a cooper by trade, and the oldest of a large family. His good record at the village school and his natural aptitude decided his father to send him to the College of Perpignan and later to the Lycée Charlemagne in Paris. In 1869 he entered the École Polytechnique with the intention of becoming an engineer. At the outbreak of the Franco-Prussian War in 1870, Joffre who was then nineteen years old and in his second year at the School was appointed Second Lieutenant and assigned to the defense of some of the Paris forts. After the war he entered the "Ecole d'Application" at Fontainebleau. At the age of twenty-four he was a captain and had already received the cross of Chevalier of the Legion of Honor.

In 1884 Joffre started his brilliant military career in the French colonies, including Tongking, Sudan, Madagascar, and Indo-China. His talent as administrator and as military engineer, his extraordinary capacity for work, his courage and devotion brought him the highest praises from his superiors and from the government. In 1894 he was promoted to the rank of Colonel and in 1902 at the age of forty-nine he was a General. The following year he was made a "Commandeur" of the Legion of Honor and in 1909 "Grand Officier." In 1910 he was appointed to the Superior War Council, of which he was the youngest member, and in 1911 he became Chief of Staff, a position

which implied that in case of war he would be the Commander in Chief of the French armies. In appointing him, M. Etienne, Minister for War, wrote: "General Joffre is a strong, powerful and eminent personality. His intelligence, which possibly works slowly, is luminous. He possesses an immense faculty for work; his information and conclusions are marked by rigorous precision. His attention to details may be considered excessive by some, but in modern war it is of great importance. Above all Joffre has a decision possibly slow, but in which he persists, while his calm cannot be shaken."

When in 1914 the order of mobilization was issued, Joffre was so thoroughly prepared for this eventuality that it was effected with such rapidity and order as to be a source of wonder.

It is not within the power or ability of the writer to do more than recall here as Joffre's historical and heroic achievement the Battle of the Marne, so often referred to as the "Miracle" of the Marne. Let his immortal order to his soldiers dated September 6, 1916, be placed on record in these pages:

"At this moment when a battle is to be fought upon which depends the salvation of the country, it is necessary to recall to all that the time has passed to look behind. All efforts must be directed to driving away the enemy. Any troop unable to continue its advance must at all costs retain the territory it occupies and should be prepared to die rather than fall back. In the present circumstances no weakness can be tolerated," and after the victory these simple words: "You have all, officers and soldiers, answered my call—you are entitled to the gratitude of the nation." And indeed France had been saved.

Poincaré in his memoirs gives his impression of Joffre shortly after the battle of the Marne: "We find Joffre in good health, physical and mental. He is as I have always known him, as he must have been in the past at Formosa, in Tongking and at Tombouctou, impassible, smiling and gently opinionated. We note his powerful and massive frame, his clear brow, his thick white mustache, his light blue eyes shining under bushy eyebrows. Everything in him gives the impression of stability and of *sangfroid*, that is, of those military virtues which are perhaps rarest and most essential in the uncertain times in which we are living. What would have become of us after Charleroi with a commander in chief richer in imagination, but nervous and impulsive?"

All great men have their detractors who would take away some of their glory and dim the luster of their deeds. It was not to be expected that Joffre would escape unjust if not malicious criticisms. Those best qualified to speak, however, never failed to give Joffre full credit for his great victory. Let us recall Foch's words: "The battle of the Marne was undoubtedly a great victory. It belongs to the man who had prepared for it as early as August 24 and who to the end worked to bring it about, to General Joffre . . . He did not hesitate to retreat until the favorable moment, and when that moment arrived, to combine judiciously offensive and defensive after a facing about energetically ordered. In a magnificent stop he dealt a mortal blow to the invader."

His great heart and the depth of his emotions are revealed in his words spoken at Thann in Alsace in the early months of the war: "Our return is definitive. You are forever French. France brings to you the liberties she has always represented, the respect of your liberties, of the Alsatian liberties, of your traditions, of your convictions, of your customs. I am France, you are Alsace. I bring you the kiss of France."

On the eve of a great offensive in September 1915 Joffre again appeals to the patriotism and heroism of his troops: "Your will to conquer will be irresistible. Your first rush will carry you to the batteries of the enemy, past the fortifications opposed to us. You will give him neither rest nor mercy until you have achieved complete victory. Move forward, whole heartedly for the deliverance of the fatherland, for the triumph of right and of liberty."

During the tragic days of the siege of Verdun he retained his extraordinary calm, and refused to be apprehensive, even when the military situation appeared desperate to all others. A witness drew this picture of Joffre in those momentous days: "Of this massive, rubicund figure emanated that night a formidable serenity rendered opinionated and hard by the furrow between the bushy eyebrows as white as snow. But, startling contrast, the eyes of a tender and pure blue, recalled those of a child. Around him his officers, silent but obviously feverish and nervously strained, received from that man quietly seated an impression of strength which mastered their agitation and anguish."

In July 1916 after the failure of the great Somme offensive, organ-

ized by Joffre, from which so much was expected, his critics renewed their efforts to have him deprived of the supreme command, and finally in December of that year he was recalled by Briand, at the time head of the Cabinet, and assigned to the post of "Technical Counselor of the Government in Matters pertaining to the conduct of the war," General Nivelle with Joffre's approval being appointed Commander in Chief of the French armies.

In December 1916 at the recommendation of General Lyautey, at the time War Minister, Joffre was made Marshal of France. On that occasion Lyautey wrote to President Poincaré in the following terms: "The dignity of Marshal of France, established by law, which during a long period of peace has come into disuse, could not be revived under happier auspices than in conferring it on the general who on two different occasions, at the Marne and at the Yser has victoriously repulsed the crushing advance of the enemy's armies at a time when they expected to accomplish their purpose and to force us to submit to their will. The entire nation expects from the government this act of gratitude and justice." This great honor marks also the end of Joffre's active participation in military operations.

After the entrance of the United States in the war, Marshal Joffre accompanied by Viviani and other distinguished Frenchmen made a triumphal tour of the United States, being welcomed everywhere with the greatest enthusiasm. He received on that occasion an honorary degree from Harvard University; President Lowell in conferring it expressed himself as follows: "Joseph Jacques Césaire Joffre, Marshal of France, a commander whose calm courage and sagacity shone as a guiding star in a dark night, whose genius at the Marne wrung from defeat a victory that saved France, and, with France, the world."

In February 1918 Marshal Joffre was elected member of the French Academy. In his discourse he refers to his great affection for the French army: "My love for it is infinite, and I cannot imagine finer soldiers, greater heroes than those at whose head destiny has placed me during three years."

Richepin replied in part as follows: "If you had lost the battle of the Marne you would have remained for ever pilloried in history under the name of the vanquished of the Marne. On the other hand, since you have won it, that battle, justice demands that you be for

ever known as the victor of the Marne . . . While still alive you have become not only immortal, but legend itself claims you . . . The day will come when from the heart of the son or grandson of one of your poilus, like them unknown and sublime, will spring a beautiful popular song, which all France will sing and which humanity will repeat; it will become the Marseillaise of the deliverance; it will be the hymn of the Marne, the song of Joffre."

After all these marks of admiration and of affection, loaded with honors, loved by the entire nation and by the world, Joffre spent the remainder of his life in a modest Paris apartment, retaining his interest, however, in military matters and in all things affecting the welfare of France, attending the meetings of the French Academy and writing his memoirs. He never condescended to reply to his critics who would have belittled the part he played in the battle of the Marne: "Let them talk" he said; "if I had lost the battle they would not attempt to divide with others the responsibility for the defeat."

On the occasion of the dedication of a statue of Joffre at Chantilly, Hanoteaux spoke in part as follows: "When the formidable battle was about to begin, no captain, not even Napoleon, had ever commanded such immense armies . . . Fortunately the French army had at its head a soldier who was not a visionary nor pedantic nor a sword rattler . . . Hardly a month had passed before the soldiers had sensed in that Frenchman, so like themselves, the French good sense, the French heart, and all that constitutes the man of France, calm, clear vision, quiet reason, decision and courage to be carried to the point of death, the will to do one's duty without bargaining . . ."

At the end of 1930 Joffre's health began to fail. In December of that year it became necessary to amputate one of his legs threatened with blood poisoning. He died on January 3, 1931, exactly one week before the seventy-ninth anniversary of his birth.

On January 7th, Joffre was buried at the "Invalides" where Napoleon and Foch also lay. His final resting place, however, according to his wishes, will be at Louveciennes, where his lifelong companion may rest near him.

On the Esplanade of the Invalides as the echo of the last gun was dying out, Barthou, at the time Minister of War, pronounced these simple words: "It is because he has served those noble causes, love

of right and respect for justice, it is because he has saved the liberties of the world that Joffre, the French victor of the Marne, has taken his place among the servitors of humanity and of peace!"

ALBERT SAUVEUR

ARTHUR DEHON LITTLE (1863–1935)

Fellow in Class I, Section 3, 1913

The life of an extraordinarily versatile man came to a close on August first, 1935. The world has lost a leader in whom fine character and exquisite sensibilities were united with penetrating intelligence exercised with a rare capacity for tireless effort.

Arthur D. Little was most widely known as the outstanding pioneer in the application of science to industry. Indeed his achievements in this field by their very importance overshadowed very important and less widely known accomplishment. His interests were virtually unbounded, the sweep of his imagination unrestricted, while his power to formulate and organize not infrequently overmatched the capacities of his followers and contemporaries. Like many men of large endowment, he was generous, tolerant, and kindly to an unusual degree.

Doctor Little was born in Boston on December 15th, 1863, and attended the public schools of Portland, Maine, and subsequently the Berkeley School of New York. He entered the Massachusetts Institute of Technology in 1881 and on leaving the Institute became the chemist and later the first superintendent of the first sulphite wood pulp mill in the United States,—that of the Richmond Paper Company. The mill was a ten ton unit at Rumford, Rhode Island, installed in 1884 when organized knowledge of chemical engineering was nonexistent. The process was inherently right but the apparatus design inherently and completely wrong. No better test of the resource and courageous persistence of A. D. Little could have been devised than that afforded by the final success of the process. The disabilities of the original design led incidentally to our subject's first patent (U. S. Patent 351,330, October 1886).

The period beginning with 1890 saw the introduction into the United States of many new industrial processes; a natural growth, of course, of the rapid quantitative development of both physics and

chemistry during the nineteenth century. Note Hall and Heroult's electrolytic process for aluminum (1890); Acheson's manufacture of carborundum (1891); the establishing of the calcium carbide and cyanamid industry (Willson, 1892); the Diesel engine; artificial silk by Cross and Bevan, brought to the United States by A. D. Little in 1893; chrome tanning demonstrated by A. D. Little, 1893; the automobile, 1894; cellulose acetate, A. D. Little, 1894; X-rays, 1895; radioactivity, 1896; synthetic indigo, 1897; radium, 1898. Truly these were stirring times industrially for a young man entering upon an unrecognized profession.

Artificial silk produced by Count Chardonnet from nitrocellulose became known at the Paris exhibition of 1889. The process of Cross, Bevan and Beadle for artificial silk, now known as the viscose process, was communicated to Doctor Little in 1893. He at once saw the range and importance of the manifold applications of the cellulose thiocarbonates and derived products. In a paper of August, 1894, (J. Franklin Inst.) there is reported the results of an extraordinary amount of investigative work resulting in such products as a cellulose glue, dense masses of cellulose, films and various admixtures of the viscose solution with untreated fibres and mineral substances, besides many other applications. "Educated money" was immensely difficult to find thirty-five years ago, and is still sufficiently difficult to find for the development of a new process. Not until about 1900, after extended development abroad, was an American company formed for the exploitation of viscose. By 1927, however, the world's production of artificial silk from viscose was somewhat in excess of 200 million pounds.

About the same period we find Doctor Little demonstrating the revolutionizing chrome tanning process of Schultz, and a patent was issued on the process in '93. The studies with viscose, cellulose acetate and like products appeared to be progressing simultaneously, for I find, among others, a patent for carbon filaments from cellulose issued in '95. Paper making problems and manufacturing improvements continued to hold a large measure of attention. Patents for waterproofed and wax papers bear the date 1902. Wood waste utilization, alcohol production, casein products, electrolytic production of chlorine and soda, hypochlorites, chlorates, constituted the pioneering work for the most part, but at the same time a prodigious

amount of thought and effort was expended in carrying on the work of the industrial chemist in checking waste, increasing plant efficiency, organizing and directing capital along the lines of new enterprises. It is truly amazing to note the many fundamentally new processes, new products and manufacturing problems which came under Little's attention in this period.

Research laboratories for the development and adaptation of scientific ideas to industry were unknown in the United States fifty years ago. Indeed, the first company owned and operated research laboratory, that of the General Electric Company at Schenectady, was organized by Willis R. Whitney only about thirty years ago. It is no exaggeration to state that until twenty years ago the industrial leader or business executive who, through either education or native perspicacity could grasp the significance of persistent research effort over a long period of time, was a remarkable rarity. The blindness and lack of perception of the leaders of many businesses in reducing or even disbanding their research organizations at the close of the "new era" is testimony to the fact that even now there is by no means a widespread appreciation of the basic role played by scientific and industrial research. The vision and courage of A. D. Little as a very young man is therefore evident with the organization in 1886 of the firm of Griffin and Little for industrial research and control. The firm prospered and was reorganized in 1900 under the name of Little and Walker (William H. Walker).

At about this period, perhaps much earlier, A. D. Little must have been turning over in his mind the problem of meeting the need in industry for well educated and thoroughly trained men. His was not a mind that could deceive itself into believing that any system of organization in industry could possibly serve as a substitute for carefully selected and competently trained personnel. He evidently foresaw with clearness the period of rapid acceleration in the application of scientific principles to industry, which was well under way in the United States when the cataclysm of 1914 punctured the peace of the world. The inauguration of the Research Laboratory of Applied Chemistry at M. I. T. took place in 1905 and Doctor Little's partner, William H. Walker, assumed the Professorship of Industrial Chemistry. The paper given by A. D. Little on the occasion of the opening of the laboratory entitled "A Laboratory for Public Service"

(*Technology Review*, Vol. XI, January 1909) contains a quality of constructive criticism, of comment, and of suggestion pertaining to industrial progress which was not only of great value at the time, but of equal value today. "Any moral or spiritual uplift," he wrote, "must find its basis in the increased efficiency of the worker, and in this stage (1905) of our industrial development no agency is more directly available for increasing this efficiency than that afforded by chemistry as applied to industry. Every waste that is prevented, or turned to profit, every problem solved, and every more effective process which is developed makes for better living in the material sense and for cleaner and more wholesome living in the higher sense."

Doctor Little's industrial contacts and activities were expanding steadily in the period from 1900 to 1914. By 1909 he had brought into existence an organization consisting of a number of departments manned by specialists whose activities were correlated and brought to bear on a wide variety of industrial problems: research in fuel engineering, lubrication, forest products and wastes, textile problems, fermentation investigations, besides all the testing and control work incidental to this activity. By 1911, the business was over seven times what it had been in 1904. In 1917 the present model industrial research laboratory on Charles River Road in Cambridge "Dedicated to Industrial Progress" was built and placed in full operation. It was an opportune moment, for the enormous expansion of American industry, caused by the huge demands for supplies of all sorts by England and France, immediately emphasized the importance of research and scientific control of operations.

Doctor Little's efforts during the American participation in the war, in its immediate and tangible aspects, centered around the development of airplane dopes, acetone production and smoke filters, among other things. His process of setting the smoke-filter fibre on the gas mask cannisters is now the approved process, and the gas mask as developed at A. D. Little Inc., became a part of the standard equipment of the U. S. Army. That all these very practical results were important may be readily admitted. There was other even more important work to be done and that of a kind few chemists do well. Someone has remarked that the man of science is the only one in the world with anything really important to say, and he doesn't know how to say it. Doctor Little was a conspicuous exception, for he

always had something important to say and he knew how to say it. I often wonder if his greatest contribution from 1915 on did not lie in the stimulus, impetus, and direction given to industrial research through his well composed addresses, papers and essays. The beginning of the war was a moment when, German imports being cut off, the United States was hamstrung for dyestuffs, scientific apparatus, synthetic drugs and other highly necessary products dependent for their production on highly organized and scientifically controlled processes. Certainly the brilliant series of papers during this period constitutes a wonderfully clear statement of the problems to be solved, the useful kinds of organizations to be developed, and the importance of coöperation, not only between the different branches of science but between the exact sciences, economics and government. The subject of the conservation of natural resources of the country was studied and the facts correlated in an exceptionally clear, logical and forceful form of expository literary style. The range of topics touches almost every practical problem of the complicated pattern of our industrial and social life. It was the most important kind of service, and needed to awaken the consciousness of the discerning public to the importance of intelligent, immediate, and concerted action.

Interest in educational matters at M. I. T. did not lag during the hectic years of the war. As chairman of the Visiting Committee of the department of Chemistry and Chemical Engineering at M. I. T., Doctor Little was the active force that finally induced the adoption of the Chemical Engineering Practice School. The plan has worked out admirably both in the direction of providing students with a comprehensive and first hand appreciation of the significance of the theoretical work of the course in relation to practice, and in stimulating the industries to a keener sense of the importance of research. It was his interest and persistent effort that made possible the Eastman Research Laboratories.

The war, besides bequeathing us life without much joy, gave us a complex variety of evil changes and distressing disasters unparalleled in the aftermath of other wars. An intelligent man of sensitive and acute perceptions must have very uncommon internal sources for the nourishment of the soul to emerge from the experiences attending the conduct and prosecution of a modern war with unimpaired optimism and faith in the future of his civilization. Here we see a man with

calm intelligence surveying the post-war problems in a world which still resembles nothing so much as a pot of spiders trying to devour one another. During the period from 1918 to his death, A. D. Little found time for some sixty papers and addresses. The stimulus to thought and action in all directions resulting from these admirable essays can probably never be quite fully measured. The sane and objective presentations of fact, the voluminous statistical information, the constructive criticisms of worn-out points of view and procedure, the clear indication of the danger signals with respect to our long misused but dwindling natural resources is a monument to constructive and fine intelligence. A volume containing some twelve essays appeared under the title "The Handwriting on the Wall" and includes that matchless essay "The Fifth Estate."

A. D. Little served the American Chemical Society as President for two years (1912–1914). He was President of the American Institute of Chemical Engineers, 1919, and President of the Society of Chemical Industry, 1928–1929. The University of Pittsburgh conferred upon him the degree of Doctor of Chemistry in 1918. The University of Manchester (England) gave evidence of its appreciation in the form of an honorary Doctor of Science degree in 1929, while the College of Technology of Manchester made him their honorary associate. He served as chairman of the Commission on the Economy of Fuel and Raw Materials of the American Section of the International Chamber of Commerce, as vice-chairman of the Engineering Foundation Board, as a member of the Division of Engineering and Industrial Research of the National Research Council, besides other national committees. A very important work was that of organizing the Natural Resources Survey for the Canadian Pacific Railway in 1916 and 1917. He was a life member of the M. I. T. Corporation, and served the Harvard Department of Chemistry as a member of its Visiting Committee, as well as the Departments of Chemistry and Chemical Engineering of his own Alma Mater. In 1931 he received the highest award of the American Chemical Society, the Perkin Medal.

A. D. Little was a leader amongst those "having the simplicity to wonder, the ability to question, the power to generalize, the capacity to apply." He was of "the company of thinkers, workers, expounders, and practitioners upon which the world is absolutely de-

pendent for the preservation and advancement of that organized knowledge which we call science." He was one who exercised daily throughout life "the duty and the privilege of bringing home to every man the wonders, the significance, and the underlying harmony of the world in which we live to the end that all undertakings may be better ordered, all lives enriched, all spirits fortified."[1]

FREDERICK G. KEYES

CHARLES MARTIN LOEFFLER (1861–1935)

Fellow in Class IV, Section 4, 1921

In the death of Charles Martin Loeffler American music suffered a peculiar loss, since through his inborn genius he had for many years set before us ideals which, left to our native selves, we so often lack—flawless workmanship and a finish, the result of patient self-criticism and exacting toil. The adjective "American" is used intentionally, though we are aware that much loose thinking is associated with the term. There were several factors of race, environment, and training which formed the basis of Loeffler's inspiration and achievements, and yet his long career both as violinist and as creative artist is so identified with our country and its musical development these past fifty years that he may fairly be called an American musician.

In reality there are but two kinds of music, good and poor—or at any rate, less good. Those who prate loudly of the American quality in their music generally manifest in their output a kind of crude vigor and even a "hurrah, boys" spirit which reflects no special credit upon us as an artistic nation. The source of all music is human emotion, and America has no corner on that indispensable quality. Much of the music, indeed, of our native composers is lacking in emotional power; and Loeffler is one of a very few in whose music we cannot miss the white heat of emotion, which yet never becomes a mere spectacular bonfire or becomes bombastic in any way.

Loeffler's roots, as we shall see, were elsewhere and his early training was among nations of century-long traditions; but it is doubtful

[1] Quotations taken from "The Fifth Estate," an address delivered by Doctor Little at the centenary celebration of the founding of the Franklin Institute, Philadelphia, on September 19th, 1924. Published in the *Atlantic Monthly*.

if he could have found in any other country the leisure and the generous unpatronizing support which enabled him to express his best self. This seeming anomaly is, after all, nothing new in the annals of art. Some of the most famous names, for example in the French School, are those who in blood belonged wholly or in part to other nations; i. e., Lulli, Meyerbeer, Cherubini, Offenbach, and Franck. To quote a keen criticism by Professor Edward B. Hill:

"Despite the fact that analytically Loeffler must be regarded as an offshoot of the 'French School,' no just critic can fail to recognize that he attained his own style and delivered his personal message. He is like a colonist who never lost touch with the mother-country; in an alien environment he reached an intensity of expression which might never have become his in Paris. Remaining in Paris, he might have been recognized as a classic among his contemporaries. Here, he became a classic whose qualities were intensified by isolation."[1]

Charles Martin Loeffler was born January 30, 1861 at Mulhouse in Alsace, a province of France. The father was a scientist specializing in chemistry; the mother, an assiduous reader, was known for her love of poetry. Just before the outbreak of the Franco-Prussian war, the family moved to a small Russian town in the province of Kiev, the father being employed by the government. When the boy was eight years old, he began the study of the violin, taking lessons from a well-known musician in the Imperial Orchestra of St. Petersburg. Certain early impressions were graved on the mind of the precocious boy so that after fifty years they served for the inspiration of an orchestral poem entitled "Memories of My Childhood—Life in a Russian Village." Soon thereafter the family moved from Kiev to a small town in Hungary, Debreczin, where the father taught at the Royal Academy of Agriculture. For a few years the musical training of the young boy was interrupted; but the time was not wasted, for Hungary then, as now, abounded in travelling caravans of gypsy musicians, and the strains of their wild, exotic music sank into his consciousness.

In 1875, after two years in Switzerland, Loeffler decided to become a professional violinist, for by now he knew that he had a natural facility for the violin. He began work in Berlin under one of the assistants of Joseph Joachim, but he also studied harmony and composition. His teacher's methods, however, did not completely satisfy

[1] *Modern Music*, Vol. XIII, November–December, 1935.

him; so he betook himself to Paris, where for two years he studied with Massart, the teacher of the famous Wieniawski. Here real foundations were laid for Loeffler's masterly technique and beautiful singing tone. Soon after, upon Massart's recommendation, he was engaged for the private orchestra of Baron von Derweis, a Russian nobleman of great wealth who maintained two establishments, one for the winter season at Nice and one for the summer on Lake Lugano. After two years, however, at the death of the Baron, the orchestra was disbanded and Loeffler decided to try his luck in America, landing in New York the first week of July, 1881.

He played under both Damrosch and Theodore Thomas until in the spring of 1882 Major Higginson, who had just founded the Boston Symphony Orchestra, having his attention called to the abilities of this promising young violinist, at once engaged him. Thus Loeffler became a Bostonian and was naturalized as an American citizen in May, 1887. When Gericke became conductor of the orchestra and Franz Kneisel was appointed as concert-meister, he and Loeffler sat at the first desk of the symphony orchestra for almost twenty years. They resigned in 1903, Kneisel to devote himself exclusively to his newly formed quartet, Loeffler to have more time for composition, the inborn ability for which had awakened in him and was becoming known to his intimate friends.

In 1900 Loeffler married Elise Burnett Fay, one of a distinguished Boston family, moved to a farm at Medfield in a beautiful part of eastern New England, and for the rest of his life devoted himself to the composition of his finely wrought masterpieces and to the teaching of a few talented pupils.

Any further account of Loeffler would naturally become a rhapsody in words over the beauty and individual distinction of his compositions. As Carl Engel states the matter in an illuminating article in the *Musical Quarterly* for July, 1925:

> "Although Loeffler's development as a composer falls precisely into the period of our national awakening in American music, he has jealously avoided following any road but his own. His music defies classification. No set term or stock formula will fit it. If it is like anything, it is like the very man who wrote it. Loeffler is *sui generis;* he is that rare and comforting thing in life and art, the perfect anomaly."

Loeffler is not a "modern composer" in the sense which that over-

worked term generally implies. With him perfection of utterance, subtle style and brilliance were a natural and spontaneous result of his artistic nature. If these rare qualities mean that the composer is a "decadent," let the moderns and even the ultra-moderns furiously rage together. As Philip Hale so well puts the matter—"Whether he is or is not a decadent is not the question; the question is this: Is the music good or bad? or you may put the question in this way: Does the music thrill, move or console me, or does it bore me?"[1] We do not find, it may be granted, in Loeffler that gripping, emotional power which was the glory of Beethoven, Wagner, Brahms, but of a very few others. He would be the last to claim this glory for himself. In five of his most inspired works, however, there is a fusion of emotion and directness of appeal which never fails to carry the hearer out of himself. These works for which we may prophesy immortality are "La Mort de Tintagiles," the "Pagan Poem," the music for four stringed instruments (dedicated to the memory of Victor Chapman), the eight part chorus, "For One Who Fell in Battle" (dedicated to Major Henry Lee Higginson) and the four beautiful songs, Opus 15, among many others.

In the eyes of some this memoir may seem highly colored with personal comments. The writer indeed hopes that this may be so. Since Loeffler was his dear and valued friend for more than thirty years and since they were often engaged in various artistic projects, it would have been impossible to write of his life and achievements without deep personal feeling. Although somewhat reserved and austere in manner, Loeffler *au fond* had a warm and affectionate disposition. This trait was shown throughout his life by his love for animals, flowers, and everything good and beautiful in Nature.

Already Loeffler has taken on the aspect of a legend; for, as Professor Hill accurately states the matter, "as a virtuoso in whom subtlety of detail never obscured vigor of interpretation, as an erudite and witty companion with a rich background of experience and anecdote, as a man of acute and varied tastes, and, in his music, as a master of finesse and almost eerie delicacy, equally at home in moods of robust vigor, Loeffler remains an unparallelled figure in our recent musical life."[2] Loeffler was also religious in the best sense of that term.

[1] *The Musical Quarterly*, Vol. XI, No. 3, July, 1925.

[2] *Modern Music*, Vol. XIII, November–December, 1935.

This attribute is evidenced from his use of Gregorian melodies in his compositions and, above all, in his "Hymn to the Sun" on a text from St. Francis of Assisi, and in his "Hora Mystica," a symphony for full orchestra and chorus of men's voices.

Loeffler died May 19, 1935. His last words, a greeting to his loving friends, might well be the familiar words of the psalmist, "The Lord is my strength and my song, and has become my salvation."

WALTER R. SPALDING

ERNEST GALE MARTIN (1876–1934)

Fellow in Class II, Section 3, 1915

Ernest Gale Martin was born at Minneapolis, Minnesota, November 16, 1876. After receiving his Bachelor's degree at Hamline University he studied physiology under W. H. Howell, at Johns Hopkins, and received the Ph.D. degree in 1904. During the years 1904–1906 he was Instructor in Anatomy and Physiology at Purdue. From 1906 until 1916 he taught physiology at the Harvard Medical School, and in later years of the period he taught also at Harvard College. In 1910 he became Assistant Professor of Physiology in Harvard University. In 1916 he was appointed Professor and head of the Department of Physiology at Stanford University.

Professor Martin's earliest researches were on the effects of blood salts on the heart. He later devised a method for quantitative measurement of induction shocks, which was published in a small volume. His quantification of electrical stimuli allowed him and collaborators to examine the variations of the sensitivity of dermal nerves by a delicate method. The variations of sensitivity in different circumstances were thus determined. He also devised means of testing the strength of voluntary muscles in human beings—a method which has proved valuable in learning the effects of treatment in cases of poliomyelitis. Among his other researches were studies on vasomotor reflexes, industrial fatigue, metabolism of muscle and the capillary circulation in muscle.

Dr. Martin was associated as a physiologist with the Board of Health of Vermont during one of the epidemics of poliomyelitis in that State. He served during the War as Captain in the Sanitary Corps. He was a prominent member of the American Physiological

Society, and in 1915 was elected a member of the American Academy of Arts and Sciences.

In his relations with students and colleagues Dr. Martin was thoughtful, kindly and considerate. He was an inspiring teacher. His exposition of complicated physiological processes was always clear and definite. For many months before his death he suffered from a distressing illness which he bore with fortitude. He died October 17, 1934. A well-organized Department of Physiology which he had developed at Stanford University will preserve his spirit of cheer and enthusiasm.

W. B. Cannon

ANTOINE MEILLET (1866–1936)

Foreign Honorary Member in Class IV, Section 3, 1931

The passing of Paul-Jules-Antoine Meillet at his country-seat at Châteaumeillant (Cher) on September 21, 1936, marks the loss to comparative linguistics of one of the most brilliant and distinguished scholars who have adorned that relatively small but highly important department of science. Like so many devoted to pure learning, the outward events of his life may be summarized briefly; but, again, like so many of them, his influence, not only through his published writings, but also through his profound effect upon those who came in contact with him whether as pupils, colleagues, or friends, will long live and increase in power.

He was born at Moulins (Allier), November 11, 1866, and received his training first at the Lycée of his native town and then at the Faculté des Lettres and the École des Hautes Études at Paris (Agrégé de Grammaire, 1891, Docteur ès Lettres, 1897), where he came especially under the influence of Ferdinand de Saussure, the inspiring mind of the Franco-Swiss school of linguistics. Most fortunately, Meillet was able to begin his academic career at once when he was appointed Maître des Conférences at the École des Hautes Études in 1891. In 1904–06 he was professor at the École des Langues Orientales Vivantes, and in the latter year he became professor at the Collège de France. Academic honours were justly showered on him. He was a member of the Académie des Inscriptions et Belles-Lettres, Commandeur of the Légion d'Honneur, and an associate or corresponding member of

the Academies of Amsterdam, Belgrade, Brussels, Copenhagen, Cracow, Dublin, Göttingen, Oslo, Petrograd, the Philological Society of London, the Société finno-ougrienne of Helsingfors, etc., and the writer had the privilege of proposing him as a Foreign Honorary Member of this Academy. In the learned life of linguistic circles in Paris, no session was complete unless he was there: the Société de Linguistique, the Société Asiatique, the Société des Études Arméniennes, the Institut d'Études Slaves, and all the rest profited from his contributions or from his informal observations. Besides all this, he was friend, counsellor, and guide to a host of students and scholars who sought his advice, never in vain. He gave himself unsparingly, and with no thought of self; there was no branch of Indo-European linguistics in which he was not interested, none to which he did not make contributions of value. And yet, brilliant and profound as he simultaneously was, he was never dogmatic, much less overbearing; he was the most modest and unassuming of men; I doubt if he ever realized the affection and esteem which he inspired. He was invited to lecture in many of the learned centres of Europe—Amsterdam, Oslo, Belgrade, etc.—and for one session he was Visiting Professor in the Romance Department at Columbia University.

Meillet's writings were voluminous. His contributions to learned journals were frequently somewhat daring; his books were distinctly conservative—in the one class, he put forth new ideas to essay the ground and to stimulate thought on the problems involved; in the other, he summarized the results in the light of experience gained. In addition to all his other tasks, he wrote practically all the reviews for the Société de Linguistique for many years; and it is clear that he actually *read* all that he reviewed, though how one man could do it all must remain a mystery. He was interested, too, in more than mere operations with sounds, forms, and etymologies; with equal enthusiasm he studied the social aspects of linguistics and the reasoning of primitive thought as reflected in language. He was not only one of the greatest of general comparative linguists, but he was equally an authority in what I am wont to call 'social linguistics,' as well as in Iranian, Tokharian, Armenian, Greek, and Italic.

The list of Meillet's published volumes, every one of which is indispensable for the linguist, is as follows: *Recherches sur l'emploi du*

génitif-accusatif en vieux-slave (1897), *De indo-europaea radice *men- "mente agitare"* (1897), *Études sur l'étymologie et le vocabulaire du vieux slave* (two parts, 1902–05), *Introduction à l'étude comparative des langues indo-européennes* (1905; 7th ed., 1934), *Esquisse d'une grammaire de l'arménien classique* (1906; 2d ed., 1936), *Les Dialectes indo-européens* (1908; 2d. ed., 1922), *Armenisches Elementarbuch* (1913), *Aperçu d'une histoire de la langue grecque* (1913; 4th ed., 1935), *Grammaire du vieux perse* (1915; 2d ed., in collaboration with Émile Benveniste, 1931), *Caractères généraux des langues germaniques* (1917; 4th ed., 1930), *Les Langues dans l'Europe nouvelle* (1918; 2d ed., with a statistical appendix by L. Tesnière, 1928), *Linguistique historique et linguistique générale* (a collection of some of his less technical studies in various journals, 1921; a second volume has just appeared), *Grammaire de la langue polonaise* (in collaboration with Mme. de Willman-Grabowska, 1922), *Les Origines indo-européennes des mètres grecs* (1923), *Grammaire de la langue serbo-croate* (in collaboration with A. Vaillant, 1924), *Le Slave commun* (1924; 2d ed., in collaboration with A. Vaillant, 1934), *Les Langues du monde* (edited in collaboration with Marcel Cohen, 1924), *Trois conférences sur les Gâthâs de l'Avesta* (1925), *Traité de grammaire comparée des langues classiques* (in collaboration with Jean Vendryes, 1925; 2d ed., 1927), *La Méthode comparative en linguistique historique* (1925), *Esquisse d'une histoire de la langue latine* (1928; 2d ed., 1933), and *Dictionnaire étymologique de la langue latine* (in collaboration with Alfred Ernout, 1932).

Four years before his death, Meillet was stricken by hemiplegia; but fortunately his mental vigour remained unimpaired, and he worked with almost undiminished activity to the very last, projecting an Armenian etymological dictionary in collaboration with Rev. Father Louis Mariès. Happily too, and justly, his closing years were brightened by the affection of his pupils and friends, who collaborated with him and for him, and by the devotion of his wife (née Mlle. Mercédes Garcia), whom he married in 1915, herself a lady of unusual linguistic ability, who aided him in his labours and presided with charming hospitality over his home.

LOUIS H. GRAY

LAFAYETTE BENEDICT MENDEL (1872–1935)

Fellow in Class I, Section 3, 1930

Internationally recognized as a great authority on nutritional physiology and honored by innumerable educational institutions and scientific and literary societies, Lafayette Mendel pursued an intensive life, primarily as a college professor. Everything else was secondary to him. Even his research was so identified with the welfare, progress, and future of his students that it took on an added, keen interest for him. With superior intellectual equipment, with his strong leaning toward the classics in his early student years, he entered science magnificently trained for his brilliant career. He was a strong believer in individuality in research but recognized equally the necessity for accepting corresponding responsibility. These beliefs dominated his colleagues and co-workers throughout his life. Those connected with him, not simply as friends but as co-workers, always marvelled at his comprehensive command of the literature, his clearness of expression, and above all his splendid spirit of coöperation. To team with Mendel meant success. One can easily understand why among such classic coöperators as "Lavoisier and La Place" and "Raleigh and Ramsey" the association of "Osborn and Mendel" will remain historically permanent.

Ultra-conservative in many ways, Mendel was intensely dynamic in his scientific life. Although not in rugged health, he never spared himself until probably too late to control favorably the inroads of disease. We who knew him intimately realized that his was a real sacrifice of time and health to science. All his associates found that coöperative work with him brought out their very best qualities. There was in every sense truest coöperation. With his comprehensive knowledge of the literature and his unusual experimental experience, he was firm in his own beliefs. Yet he was equally ready to consider the deliberate judgment of his associates, and thus when a written report of an investigation was prepared, a better paper always resulted. Only his intimate friends and particularly his students can write adequately of his charming personal nature, his thoughtfulness, his aspirations for their welfare, his solicitation for their success. A host of young men and women have passed through his laboratory in the past thirty-five years, each better equipped to do life's work and each thoroughly determined to do his work to the

best of his ability. This spirit Mendel infused in all who came in contact with him.

One would think that the demands of teaching, which Mendel took very seriously, and the conduct of research would be enough to occupy the full time of even the most rugged of men, but there never was a public service demanded of Mendel that did not find him ready to give all that he had in its interest. In fact, perhaps his most serious fault was that the word "no" did not exist in his vocabulary, and this disposition to refuse no one undoubtedly hastened his untimely end.

Lafayette Mendel was born on February 5, 1872. He received the degrees of A.B. and Ph.D. from Yale University in 1891 and 1893 and later continued his studies at the Universities of Breslau and Freiburg. For 43 years he was a member of the faculty at Yale University, beginning in 1892 as an assistant in physiological chemistry at the Sheffield Scientific School and being promoted subsequently to the positions of assistant professor and professor of physiological chemistry. From 1921 until his death on December 9, 1935, he served as Sterling professor of physiological chemistry at Yale University. He received the honorary degree of D.Sc. both from the University of Michigan and from Rutgers University, and the degree of LL.D. from Western Reserve University. He was awarded a gold medal by the American Institute of Chemists for his contributions to chemistry and the 1934 Conné Medal by the New York Chemists Club for his chemical service to medicine. In 1910 he was appointed a research associate of the Carnegie Institution of Washington and in 1930 a research associate of the Connecticut Experiment Station. He was active on the editorial boards of the *Journal of Biological Chemistry*, the *Journal of Nutrition*, and the Scientific Monograph Series of the American Chemical Society. He was a member of the American Academy of Arts and Sciences and of many other learned societies, both in the United States and in Europe. His scientific publications number several hundred, dealing with vitamines, protein metabolism, accessory food factors, the physiological chemistry of digestion, and the physiology of growth.[1]

FRANCIS G. BENEDICT

[1] Biographical notices of Professor Mendel have appeared in almost all contemporary scientific journals and transactions. The writer has prepared one for the American Philosophical Society.

CHARLES ELWOOD MENDENHALL[1] (1872–1935)

Fellow in Class I, Section 2, 1935

Charles Elwood Mendenhall was born at Columbus, Ohio, on August 1, 1872, the son of Thomas Corwin Mendenhall, a distinguished physicist who was then professor at Ohio State University, and who later, after a number of other offices, became president of Worcester Polytechnical Institute. The younger Mendenhall followed in his father's footsteps, becoming himself a physicist of great distinction, and serving for many years, until his death on August 18, 1935, as professor of physics at the University of Wisconsin.

Mendenhall's undergraduate training was received at the Rose Polytechnical Institute of Terre Haute, Indiana, of which his father was at the time president. After graduating in 1894, he taught for a year at the University of Pennsylvania, then proceeded to the Johns Hopkins University, receiving his doctor's degree in 1898 for a thesis concerning the black body radiation from a hollow cavity, conducted partly in collaboration with Frederick A. Saunders, now chairman of the physics department of Harvard University. After three years as instructor at Williams College, Mendenhall was called to the University of Wisconsin as assistant professor in 1901, where he remained for the rest of his life, becoming full professor in 1905, and chairman of the department in 1926. He was elected to the National Academy of Sciences in 1918, was president of the American Physical Society from 1923 to 1925, and was elected Fellow of the American Academy of Arts and Sciences in 1935, only a few months before his untimely death at the age of 63. He was married on February 14, 1906, to Dorothy M. Reed, of Talcottville, New York, herself a scientist interested in the medical care of small children, and is survived by two sons, Thomas Corwin and John Talcott Mendenhall, and by his wife.

During his years at Madison, Mendenhall not only pursued his own research, but took unusual interest in the progress and the research of his students, and was the moving spirit in one of the effective departments of physics of the country. His own experimental work

[1] In preparing this notice I wish to express my indebtedness to Professor J. H. Van Vleck, who has prepared a bibliographical notice for the National Academy of Sciences.

covered a wide range of problems. Beginning with his doctor's thesis, there was a long series of papers on heat radiation, pyrometry, and related subjects. A different field to which he made important contributions was the constitution of solids. Photoelectric emission occupied him and his students during his later years, and the laboratory at Madison became one of the centers for work in this field. Many contributions of the laboratory owed their inspiration to Mendenhall, though his name was not mentioned in the title, and his friendly interest in the students and his tact and wisdom in handling his department were instrumental in building up in Madison a research group of the first quality.

At the same time, Mendenhall was engaged in important public service. During the war he served as major in the Science and Research Division of the Signal Corps, and immediately after the war he was for six months scientific attache to the American Embassy in London. As a result of these war time activities, he became connected with the National Research Council at the time of its founding. He was chairman of the Division of Physical Sciences from 1919 to 1920, continuing later as a member. From 1924 on, he was one of the three representatives of physics on the National Research Fellowship Board for Physics, Chemistry, and Mathematics, a position of great responsibility, involving the appointment of the National Research Fellowships in Physics.

The period of Mendenhall's active life coincided with the development of American physics from a relatively minor place to the leading position which it now occupies. In this development Mendenhall played a large part, both in his wise guidance of his department and in his administration of the National Research Fellowships, which were of such importance in the development of young physicists at a crucial time.

JOHN C. SLATER

ALBERT ABRAHAM MICHELSON (1852–1931)

Fellow in Class I, Section 2, 1885

Albert Abraham Michelson was born at Strelno, Germany, on the border of Poland, on December 19, 1852, the son of a Jewish dry goods merchant of forty years, Samuel Michelson, and his twenty

year old wife, Rosalie Przlubska. In 1855, when he was two years old, he was brought by his parents, via Panama, to California, where he grew up to high school age in Murphy's Camp, described by Bret Harte, and in Virginia City, Nevada, where in the issue of May 15, 1879 of the local paper he is referred to as "Ensign A. A. Michelson, a son of S. Michelson, the dry goods merchant of this city."

He was sent to San Francisco for his high school course, and upon its completion in 1869, at the instigation of his father, he took the examination for the Naval Academy. He tied with another boy, who through influence got the appointment while Michelson was made "alternate," but also given by the local congressman a personal letter to President Grant which it was hoped might enable him to get one of the ten special Presidential appointments at large to the Naval Academy. Michelson, then sixteen years of age, secured his interview with the President, and through him, after some days of trying delay, was enabled to enter the Naval Academy in the year 1869. He graduated in '73, saw sea duty until '75, and was then detailed to assist Admiral Sampson in teaching physics at the Naval Academy.

In the spring of 1877 he was married to Margaret Hemingway, a cousin of Admiral Sampson's wife. In November of that year he was studying for the purposes of a lecture, the three purely terrestrial determinations of the velocity of light that had thus far been made, one by Fizeau, one by Cornu, both by the toothed wheel method, and one by Foucault. A slight modification of the Foucault method suggested itself to Michelson, which, to quote his own words, "dispenses with Foucault's concave mirror and permits the use of any distance." Between November and March, '78 at an expense of ten dollars, he built a rotating mirror and using with it a lens and a stationary mirror which he found in the physics equipment of the laboratory at Annapolis he found that he could measure the velocity of light with greater accuracy than had been obtained by Foucault. Then his father-in-law, Mr. Hemingway, made him a gift of $2,000 for improving the precision of his measurement, and by 1880 he had as good a determination as existed up to that time, and through that measurement had sprung, before he had reached the age of twenty-seven and while he was still "Ensign Michelson of the U. S. Navy," into international repute as a physicist.

From 1880 to 1882 he was studying in Berlin, Heidelberg, and

Paris, and while there devised the Michelson form of interferometer and applied it, with funds provided by Alexander Graham Bell, to the attempt to determine the relative motion of the earth and ether. This experiment was first tried in Berlin, then moved to the Astrophysikalisches Observatorium at Potsdam; and from the negative results obtained he drew at this time the conclusion that the theory that the earth is moving through a stationary ether would have to be modified or abandoned. (See Am. Jour. Science 120, 129, 1881.) It is upon this last experiment, refined and repeated later (1887), and generally known as the Michelson-Morley experiment that Michelson's claim to immortality in physics most securely rests, for it is upon the solid basis of this experiment that no small part of the structure of modern theoretical physics has been built. This was but one, however, of the applications of the Michelson interferometer. It was the application he made of this instrument to spectroscopic problems, to cosmological problems, and to geophysical problems, that constituted by far the larger fraction of his life work.

But his title to immortality can be still more broadly stated. Michelson, pure experimentalist, designer of instruments, refiner of techniques, will live because in the field of optics he drove refinement of measurement to its limits, and by so doing showed a skeptical world what far reaching consequences can follow from that process, and what new vistas of knowledge can be opened up by it. It was a lesson the world had to learn, and the results of learning it are reflected today in the extraordinary recent discoveries in the fields of electronics, of radio-activity, of vitamins, or hormones, and of nuclear structure. All these fields owe a large debt to Michelson, the pioneer in the art of measurement of extraordinarily minute quantities and effects.

Michelson was married twice and had six children, three girls by his second marriage to Edna Stanton of Chicago, and two boys and a girl by his first marriage to Margaret Hemingway. He died at Pasadena on May 9, 1931, while still engaged in putting the final touches on the now far more accurate determination of the velocity of light, to which task he returned during the last years of his life. Thus he rounded out the cycle of his scientific career on the same problem with which he started it in 1878.

ROBERT A. MILLIKAN

HAROLD MURDOCK (1862–1934)

Fellow in Class IV, Section 4, 1918

Harold Murdock, whose death occurred at his home in Chestnut Hill, Mass., on the 6th April, 1934, was elected a Fellow of this Academy in 1918. He was born at Boston in 1862, the son of the Reverend John Nelson Murdock and Martha (Ballard) Murdock. As a child he attended a public school in Cambridge until the removal of his parents to New Hampshire, when he was sent to Colby Academy at New London.

At Colby his stay was brief—not more than six months—and was followed by his transfer to the Boston Latin School. It was after leaving the Latin School that he had his first business experience with the firm of Davenport and Company, dealers in lumber. This venture was a brief one and in 1880, at the age of eighteen, he entered the banking house of Messrs. Lee, Higginson & Company and began a business career which he followed successfully for forty years.

Ten years later he married Mary Lawson of Boston and, continuing to advance in his chosen profession he was, in 1899, elected President of the National Exchange Bank, a position which he held until the merger of that bank with the National Shawmut Bank in 1907. Of the Shawmut Murdock was Vice President until his retirement from the banking business in 1920.

For the lack of the opportunities which attending college might have given Harold Murdock he made early and rapid atonement through his own studious nature. By temperament he was thorough and exacting; he wanted facts, not half-truths; he was a skeptic, and mistrusted the glib writer or talker. Whether a matter concerned his business or his favorite avocation of historical research, he sought evidence, not opinions. The year before his marriage he had written *The Reconstruction of Europe* (Houghton Mifflin & Co.) 1889; but it was not until well into this century that he began to delight his friends with the monographs and sketches for which he will be long remembered and loved. His facts were authentic, even if the conclusions that he drew from them were sometimes iconoclastic. His style was critical, often satirical, but always had an indefinable charm, particularly when touched with the whimsical. In 1906 he published *Sir William Kircaldy of Grange* (Club of Odd Volumes), followed by: *Earl Percy's Dinner Table* (Houghton Mifflin & Co.) 1907; *The Great*

Boston Fire (Houghton Mifflin & Co.) 1909; *A Country Library* (Club of Odd Volumes) 1911; *The Nineteenth of April, 1775* (Houghton Mifflin & Co.) 1923; *Earl Percy Dines Abroad,* (Houghton Mifflin & Co.) 1924; *Bunker Hill* (Houghton Mifflin & Co.) 1927.

In 1916 Harvard had made Murdock an Honorary Master of Arts and in 1919 President Lowell appointed him one of a committee of three to examine the financial structure of Harvard University and make recommendations in regard thereto. In 1917 he was elected an honorary member of Phi Beta Kappa, and in 1931 was appointed by the Corporation an Associate of Leverett House.

In 1920 the Harvard University Press, founded some seven years before, was in unsound financial condition and Murdock, who was retiring from the vice presidency of the National Shawmut Bank on account of the unsatisfactory condition of his health, was invited to become its director. His new duties were expected to require a portion only of each day and to give him relief from the ritualistic detail of his bank position. It would have been difficult to find a man better fitted for the position. Equally a master of affairs and of the world of letters, in possession of a notable library, widely known amongst collectors and dealers, he possessed an appreciation and discriminating judgment of books and prints, and had an expert knowledge of business and figures. Under his direction the Press prospered, its accounts were separated from the University and a cost finding system introduced. As printing adviser to the University he secured his old friend, Bruce Rogers, who had just returned from several years at the University Press in Cambridge, England. In 1920 the Press was publishing about twenty books a year. At the time of his death the record was ninety and of a quality of printing and design which made them unsurpassed in their class of bookmaking,

In addition to being a Fellow of this Academy Harold Murdock was a member of the Massachusetts Historical Society, the American Antiquarian Society, the Colonial Society of Massachusetts, the Society of Colonial Wars, and the Sons of Mayflower Descendants.

FRANCIS R. HART

MILMAN PARRY (1902–1935)

Fellow in Class IV, Section 3, 1932

Milman Parry was born in San Francisco on June 20, 1902, the son of Isaac Milman and Alice (Emerson) Parry. His early education was in the public schools and in the Polytechnic High School, from which he entered the University of California. Here he discovered that his major interest was to be literature in all its aspects. He began the study of Greek, and rapidly mastered the language; he also became interested in Anthropology. He graduated in 1922, and received the degree of A. M. in 1923. From 1924 to 1928 he pursued his studies at the University of Paris, chiefly under the direction of Aimé Puech and Paul Mazon. In 1928 he won the degree of Docteur-ès Lettres, and returned to America.

During the year 1928–1929 Parry was Professor of Latin at Drake University. In the following year he came to Harvard as Instructor in Greek and Latin and Tutor in the Division of Ancient Languages; in 1932 he became Assistant Professor. As tutor he was associated with Kirkland House; he also acted for several years as Secretary of the department of the Classics, and was for three years an editor of the *Harvard Studies in Classical Philology*. He was the leading spirit in the striking production of the *Philoctetes* of Sophocles given by the Harvard Classical Club in 1933.

Parry was one of those rare and happy scholars who early find an absorbing and fruitful field of study. To it he devoted himself wholeheartedly, communicating his enthusiasm to his students and friends so successfully that within the few remaining years of activity that were his portion he made his mark and pointed the way for others who will continue his researches. His special interests lay at first in the Homeric poems. For him these were not merely poems of surpassing grandeur; they represented the flowering of a method of oral composition which he proceeded to investigate with characteristic acuteness and vigor. In his Paris dissertations, and in succeeding articles, he studied the repeated lines, the formulaic phrases, and the fixed epithets of the Homeric poems, showing how they lent themselves to the living art of successive minstrels and of a supreme poet. These principles he elaborated in studies dealing with matters of language, metre, and style. Any future study of Homer must take

into account this new turn which Parry gave to the interpretation of the poems.

In the course of his Homeric studies Parry became convinced that powerful support for his views was to be found in the study of a living tradition of oral poetry. He therefore learned the Serbian language; and after a preliminary visit of reconnaissance to Jugo-Slavia in the summer of 1933 he spent the period from June, 1934, to September, 1935 in that country, studying the poetry of the Southern Slavs as it lives on the lips of countless obscure singers. He collected songs in many districts, and recorded by phonograph some 11,000 songs. By noting how songs vary fron singer to singer, and how old material is used by a new singer, he sought to establish the essential nature and method of a living tradition of oral poetry. He hoped that the publication of his materials might contribute to more far-reaching studies in the fields not only of Comparative Literature but of History, Anthropology, and Musicology.

Parry was married in May, 1923, to his classmate Marion Thanhauser. She and their children, Marion and Adam Milman, shared his life in Paris, in America, and in Jugo-Slavia. In his home life, as in his relations with his students and in his friendships, one was aware no less of his broad human interests than of his scholarly devotion. Quiet in manner, incisive in speech, intense in his activities, he exemplified the ideal that he once described in a memorable address, "the dignity of the life of the mind."

On what was expected to be a brief visit to California, Parry met his accidental death in Los Angeles on December 3, 1935.

WILLIAM C. GREENE

WILLIAM LAMBERT RICHARDSON (1842–1932)

Fellow in Class II, Section 4, 1879

By the death of Dr. William L. Richardson on October 20, 1932 this community lost one of its most useful citizens, whose long life was chiefly devoted to the promotion of medical education, the alleviation of human ills, and the promotion of the public interests of medicine.

He was born on September 6, 1842, at his parents' home on the corner of Pearl and High Streets, in that part of Boston which was

then residential but is now in the heart of the business district. His father was a well-known merchant of that time, and his mother, Julia Lambert Brackett, came of an old Boston family.

Richardson graduated from Harvard College in 1864 and from the Harvard Medical School in 1867, having received the degrees of A.B., A.M., and M.D. His medical training thus antedated the drastic changes initiated by President Eliot when in 1870 he undertook the reform of medical education at Harvard. Richardson apparently did not seek an appointment as house officer at either of the two existing hospitals in Boston, but went abroad to round out his studies in Vienna and Dublin, where he interested himself particularly in obstetrics. On his return to Boston, in 1868, he promptly received appointments at the Massachusetts General Hospital, the Children's Hospital and the Boston Dispensary, at the former of which institutions he continued to serve as Visiting Physician until his retirement. He served also as Secretary of the State Board of Health.

Richardson's especial interest lay always in the field of obstetrics, and although he always conducted a large general practice his great reputation was chiefly based on specialism in the former field. Beginning as Instructor in Obstetrics at the Harvard Medical School in 1871, he became, successively, Assistant Professor in 1882 and Professor in 1886, a post which he held until his retirement in 1907.

Throughout a long and busy life crammed with useful activities it was the Boston Lying-In Hospital to which he chiefly devoted himself, and which remains as a monument to his devotion. In 1873, when he first became interested in it, the Hospital occupied a small house on McLean Street. He worked unceasingly for the improvement of these primitive facilities. The Hospital was enlarged and remodelled, an Out-Patient Department created, and a Training School for Nurses established in 1888. After the removal of the Harvard Medical School to its present situation it was Richardson's ambition that a new building for the Lying-In Hospital be added to the great group constituting the Harvard Medical Center. This was finally accomplished in 1922 as a culmination of fifty years of devoted service and generous benefactions on his part. While the physicians and benefactors who have contributed to the upbuilding of this great institution are too many to enumerate, it is not an exaggeration to say that the dynamic moving spirit through these years was that of Richardson

who lived to see the hospital take high rank among the greatest institutions of its kind in the world.

His interest in medical education and his executive ability led to his service as Dean of the Harvard Medical School for fourteen years from 1893 to 1907,—an important period, during which were planned and carried out the tremendous enlargement of the School's material facilities attendant upon its removal from the old building on Boylston Street, Boston, to the present magnificent plant on Longwood Avenue.

Richardson was a member of most of the professional organizations to which his distinction entitled him. His service to the University was rewarded by election to the Board of Overseers of Harvard College and subsequently by the conferring of the honorary degree of S.D. from the University in 1926.

Immediately on his graduation from the Medical School and before his departure for Europe, Dr. Richardson married Miss Olivia L. A. Pillsbury of Portland, Maine, who died some twenty years later. Unhappily there were no surviving children as a result of this union, and for the last forty-five years of his life his days were filled with the intense and responsible activities above described, and with the companionship of a limited but close and loyal group of friends and associates.

Many generations of medical students remember Richardson as the dynamic, magnetic and picturesque teacher of Obstetrics and of Internal Medicine. Educated before the period when scientific laboratory research had contributed much to the physician's capital of knowledge, he belonged distinctly to that school of physicians who by close observation of the phenomena of diseases, were able by native sagacity and good judgment to make themselves effective in their diagnosis and treatment to a degree almost comparable to the modern highly trained physician who depends on the exact data derived from the laboratory. He was, however, always receptive to new ideas and sympathetic with the ambitions of younger men to make medicine the beneficiary of scientific research. The period of his administration as Dean of the Harvard Medical School witnessed the judicious encouragement of both the clinical and laboratory phases of medical education.

To a comparatively few men has it been given to render such

effective service to good citizenship through numerous channels, but chiefly through the medium of the training of young physicians and the alleviation of human ills, as to our late Fellow, William Lambert Richardson.

DAVID CHEEVER

BENJAMIN LINCOLN ROBINSON (1864–1935)

Fellow in Class II, Section 2, 1892

Benjamin Lincoln Robinson, youngest of the eight children of James Harvey and Latricia Maria (Drake) Robinson and one year younger than his brother, the historian, James Harvey Robinson, was born at Bloomington, Illinois, November 8, 1864 and died at Jaffrey, New Hamsphire, July 27, 1935. Early interested in natural history, Robinson entered Williams College in 1883 but, finding little opportunity there in his chief field of interest, transferred in the autumn of 1884 to Harvard College, graduating in 1887. On June 29, 1887 he married, at Hennepin, Illinois, Margaret Louise Casson; and their single child, Chriemhild, who lived only a few years, was born at Strassburg, where Robinson pursued graduate work with Graf zu Solms-Laubach. His dissertation was in the field of plant-anatomy, leading to his Ph.D. in 1889. Returning to Cambridge in 1890, Robinson became assistant to the venerable Sereno Watson, then Curator of the Gray Herbarium of Harvard University. Full of enthusiasm for Germanic culture, Robinson for some years conducted a course in scientific German and he and his wife were prominent in the social activities of those of Germanic tradition who came to Cambridge. Upon the death of Sereno Watson, in 1892, Robinson was appointed his successor, and from that time until his death his chief thoughts, ambitions and labors centered on the research establishment placed in his charge. In 1899 he became the first incumbent of the Asa Gray Professorship of Systematic Botany, established through a gift from Mrs. Gray.

The Gray Herbarium, assembled by and forming the basis of publication of the monumental botanical studies of Asa Gray, was housed in the Botanic Garden in a compact brick structure with wooden sheathing and furnishings and already overflowing when Robinson took charge. Reference books were banked in double rows on the

library shelves and the specimens were suffering from crowding in their pigeon-holes; and those with latex, essential oils and resins (even though tinder-dry) were being riddled and destroyed by grubs and mites. Strenuous measures were imperative to save for future generations the invaluable and scientifically irreplaceable TYPE collections to which subsequent monographers will wish constantly to refer. The Herbarium, then an adjunct of the older Botanic Garden, shared such restricted funds as were contributed for the joint upkeep of both, but otherwise it was expected to seek its own support. In 1897, at the request of the Director of the Garden, the actual separation was consummated and the Gray Herbarium was established as an autonomous research department of Harvard University.

The total income of the Herbarium, out of which Robinson was forced to support scientific work and publication, to maintain a staff including a librarian, two young assistants and a mounter of specimens, to keep his institution at the front in securing specimens from newly explored territory, to purchase mounting-paper and other equipment, and to heat and repair the building, was $3600, supplemented only by such gifts for immediate use as a few loyal friends and the Visiting Committee could raise. That was the situation Robinson faced in 1897; and, since I had come to the Herbarium in 1891 as a student-assistant, I may write as one who personally witnessed steady strengthening of the establishment. At the time of Robinson's death the department to which he had devoted his life had a permanent endowment twenty-eight times that with which he started, a model noncombustible building with insect-, dust- and fireproof metal cases, a staff of ten workers, and a recognized position among the few most distinguished research institutions of the world in its field of systematic botany. The specifications for the building and its equipment were personally worked out by Robinson, every detail discussed with his associates, and the ultimate structure was to him the consummation of his dearest dreams.

In productive scientific work Robinson was untiring. Upon the death of Watson he inherited the task of bringing into final form extensive manuscripts covering many families of plants in Gray's *Synoptical Flora of North America*. The editing and the personal studies in filling out these portions of the great undertaking were most conscientiously carried through and occupied several years, the work

carried far into the evenings in the "study" of the old wooden mansion then adjoining the Herbarium, the residence of Mrs. Asa Gray, where alone gas-lights were available. During these earlier years of his studies Robinson also concentrated upon the floras of tropical North America, especially of Mexico, although he never himself visited that country but depended upon the extensive collections made by Pringle, Palmer and others who were then active in exploration.

Asked to study and report upon large collections from the Galapagos Islands, he became conscious of the lack of material in the herbaria of the United States properly to represent the vast flora of South America. Accordingly, with the National Herbarium, the New York Botanical Garden, and later some other institutions, botanical exploration of South America was started and many young botanists were sent into diverse sections of that continent for material. Cooperation with South American botanists was accelerated; and one of the most prized honors coming to Robinson was in recognition of his activity in promoting these mutual studies, his election as honorary academician of the Museum of the National University of La Plata.

Early in Robinson's incumbency of the curatorship of the Herbarium the pressing need of a revised edition of Gray's *Manual of Botany* became apparent. This revision was undertaken and I was asked to coöperate in it; in 1908 the new edition was published. Another activity of the earlier years was the formation and development of the New England Botanical Club, now a well established group of "gentlemen interested in the flora of New England." Robinson gave much attention and energy to the new organization, taking his turn in the group of distinguished presidents, which had included Farlow, Kidder, Goodale, Thaxter and Collins, from 1905 to 1908. From its inception in 1899 through thirty years Robinson was editor-in-chief of *Rhodora*, a technical journal sponsored by the Club. In the first days of this organization Robinson joined frequent field-trips to remote sections of New England, but his health was not good; he tired easily and was subject to serious pulmonary difficulties, at that time not clearly diagnosed. Gradually his field-activity waned, except for collecting incidental to enforced winter vacations in warmer climates, and he became more and more absorbed in close herbarium-study.

Strongly convinced of the need for intensive monographic work upon

individual groups of plants, as opposed to the more limited outlook upon them gained in local floristic work, he settled into the study of the great tropical American tribe *Eupatorieae* of the vast family *Compositae;* and for many years his publications and his chief thought centered upon the complexities of this seemingly limitless tribe. Of Robinson's more than 200 scientific papers nearly all in recent years are concerned with the clarification and elucidation of the eupatorioid plants of tropical America; and he looked forward to years of continued study in the same group. The necessity of trips to the botanical centers of Europe to examine the types or original specimens from which earlier botanists had described their species made him a well known figure abroad. Dignified, acute, with a courtesy unusual in this generation and a wide interest in the world's literature, art and public affairs, he was a leader in conversation and active in the promotion of the international congresses of botanists and their legislative deliberations at Vienna in 1905 and at Brussels in 1910. Those who knew him abroad recognized in him the same outstanding courtesy and formal dignity which were so familiar to his friends at home.

Robinson took his membership in learned societies seriously and keenly felt that he was in part responsible for the continuance of their traditions. The American Academy owes much to his conscientious efforts to maintain as full a quota as possible of strong botanists in its roll of fellows; the meetings of the New England Botanical Club, years after he had immersed himself in tropical Eupatoriums, were not to be neglected; and the same faithfulness to trusts and obligations marked his whole life. It is upon such loyalty that the continuation of our institutions depend. Robinson was president of the Botanical Society of America (1900), vice-president of the American Association for the Advancement of Science (1905), member of the Commission internationale de Nomenclature botanique (1905), vice-president of the International Botanical Congress at Brussels (1910), and a member of the Commission de Nomenclature générale (1926). Besides being specially active in the American Academy and the New England Botanical Club, Robinson held memberships in many scientific organizations. He was a member of the National Academy of Sciences, of the Washington Academy of Sciences, of the Massachusetts Horticultural Society (receiving their Centennial Gold Medal in 1929); corresponding member of the Deutsche Botanische Gesell-

schaft, of the Botanischer Verein der Provinz Brandenburg, of the Société botanique de Genève, of the Czechoslovakian Botanical Society; foreign member of the Linnean Society of London and of the Societas pro Fauna et Flora Fennica; and honorary member of the Chilean Society of Natural History.

For years working beyond his strength, latterly weakened by a serious surgical operation and broken by the death of Mrs. Robinson in 1932, he continued his daily visits to the Herbarium until, suffering from pulmonary difficulties which had long handicapped him and which toward the end developed into fibrosis, he was forced to go to his summer home for a rest. He did not realize his own weakness, and through this last illness his mind was constantly on the Eupatoriums and the Gray Herbarium, the two great interests about which so much of his life had centered.

MERRITT L. FERNALD

DENMAN WALDO ROSS (1853–1935)

Fellow in Class IV, Section 4, 1885

Denman Waldo Ross was born in Cincinnati, Ohio, January 10th, 1853, the son of John Ludlow and Frances Walker Waldo Ross, and died in London, England, September 12th, 1935. He graduated from Harvard College in the Class of 1875. His public honors were: Honorary Vice-President of the India Society of London, and Corresponding Member of the Gesellschaft für Ostasiatische Kunst of Berlin. From 1895 to his death he was a trustee of the Museum of Fine Arts in Boston.

I first knew Denman Ross in the early eighties when he was about thirty years old, a very mild-spoken, kindly young man with a taste for art, who, finding I was interested in drawing, asked me into his house to draw and paint with him. Thus began a discipleship of years and a life-long friendship which he never gave up, though his over-sensitive and jealous nature was deeply hurt by the partial defection of his pupil. I insert this to give an idea of the loyalty of his affections. At that time he had already received his Ph.D. for a thesis on "Early History of Land Tenure Among the Germans" (in which he had gone counter to the established authorities on the subject), but was now turning his attention to Art and even then, while

under the influence of the school of Ruskin, he was systematizing the innocent little stippled water-colors he made, using a very limited palette of two or three colors, the forerunner of the elaborate color scale and theories of design, which, twenty years later, made him famous among teachers of Art, beloved by a few painters of inquiring mind, and ridiculed and disliked by the conservatives and the academicians. Ten years or so later he went to an Art School in Paris to find out whether he wished to be a professional painter; but he discovered that his interest was in investigation and not in producing pictures. He had broken away from the shackles of Ruskin, and now, with his interest aroused by the painting of Manet, Monet and the Impressionists, he began to buy their works and to paint in a more free fashion, beginning his series of hundreds of experimental canvases. He travelled in Europe, learning to know the contents of most of the great picture galleries. He went to Egypt and finally to China and Japan, and began his great collection of Oriental Art to be added to the collection of European pictures and textiles he had bought already. It was in Oriental and Hindu Art that he became most interested toward the end of his life. He now began to find a few young painters interested in his ideas, and so he naturally took to teaching and writing. In 1899 he was appointed Special Lecturer on Design in the Architectual School at Harvard, and, ten years later, joined the Department of Fine Arts there. This gave him opportunities to disseminate his theories. He wrote and published his "Theory of Design," followed by another book "On Painting and Drawing"; and when he gave courses in the Summer School at Harvard teachers of Art came to him from all parts of the country and on their return home spread his teaching far and wide. As Chairman of the Advisory Committee on Drawing in the Public Schools of Boston, he changed the whole system, establishing one which was taken as a model in many other cities, thus revolutionizing the teaching of Art in many parts of the United States.

The help with money and friendship which he gave to poor and promising students (not only Art students) never will be known. His warm and enthusiastic heart sometimes led him astray in his benefactions. Some of those he tried to help as artists seemed spoiled by kindness. In his teaching of his own methods of painting his influence on his disciples was very powerful. His insistence on the supreme

excellence of his method was a serious weakness in his teaching, for he did not encourage his disciples to think for themselves, and showed no interest in their investigations and discoveries. Yet his teaching was extremely valuable, for it came at a time when there was little or no idea (in this part of the world, at least) of discovering what might be described as "Terms of Art" and of formulating these terms in an orderly way so that an artist might have an instrument and a language in which to describe nature and his ideas of beauty. He was ceaselessly preaching the value of Order, knowing that only by Order can Beauty be achieved.

As a collector he was magnificent, bringing to this occupation concentration, a taste refined by unceasing discipline of his perception, and the knowledge gained by the practice of painting, in which he became skilful and even masterly. The following quotation is taken from an article read at a Trustees' Meeting at the Museum of Fine Arts not long after Ross's death, by Mr. J. Templeman Coolidge. "Adequately to describe the vast number of his gifts would call for a special publication in many volumes and can only be lightly touched upon here, for they counted up to eleven thousand (those to the Fogg Museum to fifteen hundred). On the occasion of Dr. Ross's eightieth birthday, the Museum installed a selection of several hundred numbers, chosen from this vast store, which filled nine galleries. The entire Ross Collection, to which many numbers were later added, became a gift to the Museum in 1896."

Throughout his life he travelled to foreign lands. He believed that the best way to cultivate the taste was to see everything and to pick out the best of its kind. He had a passionate love of looking at the passing scene, be it great landscape or the street sights of a city. Every experience he considered valuable, even the tedium of six weeks of jury service in East Cambridge which deprived him of his beloved painting. In his eighty-second year, when he was a feeble old man, his eye lit up as he told of what he was going to do and to see during the European trip which he was planning and on which he "died with his boots on" in the midst of his sight-seeing.

His death is a real loss to the community, for in him a unique and fine personality has gone from us. Here was a man of great wealth who spent most of it to buy beautiful things for public enjoyment, living modestly, spending little on himself except for travel; a man of

the highest ideals whose main ambition seems to have been to make a fine art of living. He surrounded himself with objects of beauty, which only paused in his house on their way to the Museums. He made a fine art of writing and speaking even in the ordinary course of daily life. He tried to confine his efforts to the worthwhile; and if he made mistakes in choosing some of his beneficiaries, these were owing to his very human weaknesses of warmheartedness and the desire of affection from others. His sensitive nature suffered greatly at any blow to his affections, and his friends looked on in helpless admiration of him during the long trying years when a very near and dear relative, a member of his household and a constant companion, lived through a distressing illness of an alienated mind. He would not consider any removal to a sanitarium, to what seemed to him the inhuman coldness of an institution, and patiently bore the long trial with what cheerfulness he could summon.

His didactic habits of speech and his somewhat unnecessarily vehement pronouncements in aesthetic matters, seen from this distance in time, only make one admire the intense idealism which deprived him from seeing more than one side of a question. He will be remembered as long as those to whom he gave his friendship are alive, and as long as men and women who love beauty enjoy what he gathered for them.

CHARLES HOPKINSON

WILLEM DE SITTER (1872–1934)

Foreign Honorary Member in Class I, Section 1, 1929

Willem de Sitter was born on May 6, 1872, in the town of Sneek, in Friesland. He attended the nearby University of Groningen intending to become a mathematician. But at Groningen he came under the influence of Kapteyn (1851–1922) one of the most inspiring leaders of astronomy of his time, and soon decided to devote himself to that science. This resolution was strengthened through the encouragement and friendship of David Gill (1843–1914), director of the Cape Observatory in South Africa. Gill invited de Sitter to come to the Cape as assistant, an invitation that he eagerly accepted. He stayed there for more than two years beginning in August, 1897. His work was principally with the heliometer, an instrument for which he never lost a loyalty that was akin to affection. This ex-

perience as an observer was the only one of the kind in an unusually varied career that covered many branches of the science; it was invaluable to him in the theoretical work to which he afterwards devoted himself, giving him a feeling for the value, as well as for the linitations, of observation that is sometimes lacking in others whose work is on the mathematical side of the physical sciences.

De Sitter returned to Holland early in 1900, having been appointed an assistant to Kapteyn at Groningen. In 1908, at the age of thirty-six, he was appointed professor of astronomy at Leiden. This professorship was for a time independent of the Observatory of Leiden; but in 1919, when the directorship became vacant, de Sitter was appointed to that post as well. He was asked to submit plans for the reorganization of the observatory, and he did this after careful thought; most of his recommendations were ultimately carried out, though they were delayed by the war and the difficult conditions that followed it.

After his appointment to the directorship a good deal of his energy was taken up by his administrative duties, but he found time to carry out an astonishing amount of personal research. While he was still at the Cape he became interested in the dynamical problems presented by Jupiter's satellites, and continued to devote much attention to them throughout his remaining years. In spite of the great amount of effort that he put into this task he never quite finished it to his own satisfaction, though he left it in a state that will permit publication with little editing.

De Sitter is best known to the scientific public by his work in relativity. A life-long friendship with Einstein, who was a frequent visitor in his home, gave him an early interest in this subject and it was chiefly through de Sitter's writings that a knowledge of the astronomical consequences of the theory (developed in Germany during the war) became known to the English speaking world. De Sitter's picture of the cosmos became known as the "de Sitter universe." It is a static universe, and like that of Einstein needs modification to take into account the apparent recession of spiral nebulae discovered to us by the observations of Slipher, Humason, and Hubble.

Not many astronomers have had a sufficiently wide and intimate acquaintance with the various branches of astronomy that are concerned to enable them to set up a system of constants (velocity of light, precession, solar parallax, aberration, and so on) that is as

approximate as possible and is self-consistent. This is a problem to which de Sitter turned his attention in his later years; and the papers that he has published in this field are soon to be supplemented by one that he had nearly completed at the time of his death.

But De Sitter's greatest service to astronomy has been along organizing and administrative lines. When he came to the Leiden Observatory in 1919 he found an institution poorly equipped with instruments and men, and one playing a very minor role in the progress of science. Within ten years he made it one of the half-dozen important observatories in Europe, one in which first-rate investigations were in progress and manned by an impressive staff of workers. He had the gift of inspiring those around him with his own enthusiasm. One element of his success in this direction was the way in which he allowed every man to work out his own problems without interference and without explicit direction.

De Sitter was operated upon for gall-stones in 1919. From the operation itself he recovered completely and in normal time, but he had been given an overdose of ether, and the effects of this he never completely shook off. He became badly tubercular soon after the operation and spent nearly two lonely years at Arosa in Switzerland. For several years thereafter he had to be careful to avoid colds and the danger of pneumonia was never absent. Nevertheless he regained his full strength and vigor; when he visited this country in 1931 he undertook and carried through an arduous lecture tour, that extended from coast to coast, without showing undue fatigue. In November, 1934, his infant granddaughter, who was living with him at the time, contracted influenza and communicated the disease to her grandfather. Pneumonia followed at once and carried him off after three days' illness on November 20, 1934. He was in his sixty-third year.

Among the many honors that came to de Sitter were the gold medal of the Royal Astronomical Society, the Bruce Medal of the Astronomical Society of the Pacific, and the Watson Medal of our National Academy of Sciences. He was elected a foreign honorary member of this Academy in 1929. Other honorary memberships include the Royal Astronomical Society, the Royal Institution, the French Academy, and our National Academy. In 1925 he was elected President of the International Astronomical Union, presiding at the triennial meeting at Leiden in 1928, a meeting, by the way, that he addressed with facility in four languages.

De Sitter's family, all the members of which survive him, is an extraordinarily interesting one. There are two sons and two daughters, all of whom are married; almost every one of that circle has excellent command of English, French, German, and of course Dutch; in addition, Italian and the Scandinavian tongues are familiar to at least one of the group. One would have to travel very far indeed to find another family so thoroughly familiar with what is best in every phase of modern literature, and this intimate acquaintance extends to music, art, and world politics. But there was nothing heavy in the atmosphere of that home. The lighter side of life was not neglected, and the house resounded with the laughter of happy children, young and old.

FRANK SCHLESINGER

JEREMIAH SMITH, JR. (1870–1935)

Associate, 1928; Fellow in Class III, Section 4, 1931

Jeremiah Smith, Jr., was born at Dover, New Hampshire, January 14, 1870. He died at Cambridge after a long illness, March 12, 1935. He was fitted for college at Phillips Exeter Academy, A.B. Harvard 1892, and LL.B. 1895. In college he was interested in sport, being the manager of the football team. Reaching the law school, he realized the purpose of his life and led his class for three years. After graduation he went directly to the Bar of Boston, and formed a connection with a firm which eventually became Herrick, Smith, Donald, & Farley. He took part in the service of the American Expeditionary Force in France as captain in the Quartermaster's Corps. After the war he became counsel to the Treasury Department and adviser on financial questions on the Commission to Negotiate Peace. After the peace he became Commissioner General for the League of Nations in Hungary, in charge of financial reconstruction. Refusing any compensation for his services, he returned to work in Boston, but found himself so broken by his exhausting European work that he was unable to take up regular practice. He remained, however, at the head of the office for several years until the advance of a mysterious malady compelled him to remain at home. He was confined to his bed for several years until his death.

Smith was greatly interested in the Phillips Exeter Academy at

which he had prepared for college. He became a trustee, and was very useful in the service of this institution. He was also interested in his University, and became a Fellow, and so remained until his death. So long as he was able to do so he was very active in both these positions. He followed his father in devotion to both these institutions.

Smith's special intellectual capacity lay in an unusual degree of illuminated common sense. He was a valued counsel to his clients and, when he became adviser to Hungary, to that nation. He succeeded in re-establishing the credit of Hungary by the application of his highest qualities to the solution of a very difficult question.

He continued to make his home until death with the family of his father, Professor Jeremiah Smith, and was so happy in his home life that he died unmarried.

Smith was quick in speech and in thought. His ideas came rapidly and were formulated and spoken quickly. If his early death, caused by his intense devotion to work, had not occurred, he would probably have lent his active mind to the reorganization of his profession and his University.

JOSEPH H. BEALE

PERCY GOLDTHWAIT STILES (1875–1936)

Fellow in Class II, Section 3, 1916

The death of Percy Goldthwait Stiles on July 5, 1936, followed a long and wasting illness which he bore with stoical fortitude and fine courage. Though fatally afflicted for many months, he swept aside the suggestion of a respite, and performed his University duties to dental and medical students until the end of the academic year. Soon thereafter a debilitating weakness suddenly overwhelmed him.

Dr. Stiles was born at Newtonville, Massachusetts, on July 1, 1875. His early education he secured in the public schools of Newton. After obtaining the Bachelor of Science degree at the Massachusetts Institute of Technology in 1897, he continued there two years as Assistant in Biology. Beginning in 1899 he was a graduate student and Fellow at the Johns Hopkins University, and there, in 1902, he won the Ph.D. degree in Physiology. The next year he was Instructor in Physiology at the University and Bellevue Hospital Medical College, of New York City. In 1903 he returned to Boston as Instruc-

tor in Physiology at the Institute of Technology—a position which he held until 1917. From 1904 until 1907 he was Instructor also at Simmons College where, after being advanced to the Assistant Professorial rank, he continued teaching until 1914. In 1913, he was invited to join the Department of Physiology in the Harvard Medical School as a teacher of dental students. He had the title of Instructor from 1913 until 1916 and was an Assistant Professor in Physiology for the following twenty years.

Dr. Stiles was not an ardent investigator. In his early years he published a few researches on muscular contraction and fatigue, and in coöperation with the late E. G. Martin, he studied vasomotor reflexes. But that was the extent of his productive scholarship. He was admirable in his summarizing of physiological literature. From 1922 until 1936 he prepared thirteen progress reports in Physiology for the *New England Journal of Medicine*. Also he wrote three volumes which have had widespread approval,—"Human Physiology," an elementary textbook; "Nutritional Physiology"; and "The Nervous System and its Conservation." The exposition in these books is marked by Dr. Stiles' characteristic clarity, and enlivened by unexpected turns of phrase and illuminating analogies and examples. In the later years of his life he endured the drudgery of helping to edit "Biological Abstracts."

He was a member of the American Physiological Society, the American Association for the Advancement of Science, the Society for Experimental Biology and Medicine and the American Academy of Arts and Sciences. For many years he served the Harvard Medical School as Chairman of the Committee on Public Lectures.

Dr. Stiles was a lover of the natural beauty of Massachusetts and neighboring States and was intimately acquainted with many of their most attractive byways, because of walking trips he had undertaken during vacation periods. A charming account of these mild adventures he published in a little volume entitled, "Wayfaring in New England."

There was a whimsical spirit in Dr. Stiles which was revealed in his lectures, his conversation and his writings. It appeared also in his side interests. For many years he kept careful record of his dreams, and when psychologists and psychiatrists began to find meaning in these vagaries of the semi-conscious state, Dr. Stiles published an

account of his own experiences, illustrated by himself, entitled, simply, "Dreams."

His domestic life was touched by sorrow in the death of a child and in the prolonged illness and death of his wife. A deeply affectionate nature bound him closely to his two surviving children. He was a man of gentle character and transparent integrity, seldom stirred to harsh feeling, generous in his judgment of others and gifted with a kindly humor. His chief interests were in physiology, and of its larger aspects he was an excellent interpreter.

W. B. CANNON

MOORFIELD STOREY (1845–1929)

Fellow in Class III, Section 1, 1913

Moorfield Storey, distinguished Bostonian, died in the second half of his eighty-fifth year, having possessed from youth to old age the extraordinarily strenuous mental activity and moral enthusiasm which made him eminent both as a lawyer and as a non-partisan fighter for civil service reform, for Philippine independence, and for the advancement of the negro.

His home was always in Boston, or one of its suburbs. He was born at Roxbury, March 19, 1845; and he died at Lincoln, October 24, 1929.

He fitted for college at Boston Latin School. He graduated at Harvard in 1866, ranking sixth in a class which in its senior year numbered 106. He then entered the Harvard Law School, where he remained for about a year and two months, instead of the two years prescribed in those days. Thereupon, in the late autumn of 1867, his systematic education came to an end; but at the same time there began a long period,—no less than ten or twelve years,—of informal education whereby he was peculiarly well trained both for his career as a lawyer and for his non-professional career as an acute, astute, and constructive commentator on public affairs.

Storey's informal education was so extraordinary and so successful that it merits more careful attention than space permits. It consisted of three episodes, differing in length, and differing still more in nature: the first being about eighteen months at Washington as Clerk of the Senate Committee on Foreign Relations, the second being two months

at Boston as a member of the force of the Commonwealth's District Attorney, and the third, occurring simultaneously with general practice, being work for seven years or upwards on *The American Law Review*.

The first of those three episodes of informal education had at least three important features; for when Storey left the law school to become the Clerk of the Senate Committee on Foreign Relations, he became also the private secretary of the Committee's Chairman, Charles Sumner, and soon, by reason of being peculiarly acceptable to his Chief, he became a member of the Sumner household. His work consisted of reading and writing voluminous letters, making researches and notes for Sumner's speeches, meeting multitudinous applicants for favors,—aiding, indeed, in almost all of the public business burdening the exacting but not unkindly man who was by many considered the most powerful and busy of all public officials. Meanwhile, in Congress and at Sumner's table, Storey was hearing discussions, from the point of view of law and of policy, regarding such problems as Reconstruction, the War Amendments to the Constitution, and the impeachment of President Johnson. At the same time he was learning the practical working of the laws and of national officials. All this, though unlike the life of a law student or of a young lawyer, was obviously useful as a preparation both for Storey's career at the bar and for his non-professional service as a watchful commentator on public affairs; consequently the Washington episode, which ended in May, 1869, must be ranked as a period of informal education.

The second episode of Storey's informal education was to begin soon; for although, promptly after returning from Washington, he obtained a position in the office of Brooks and Ball, busy commercial lawyers, and thus appeared to be at the point of entering into general civil practice in the usual fashion, he unexpectedly became a clerk in the office of the District Attorney for Suffolk County, and then, having been admitted to the bar on July 31, 1869, was made Assistant District Attorney, and actually spent almost two years in the service of the Commonwealth. This experience in trying to punish crime in a great city was peculiarly useful; for the lawyer-like methods of his law school days were now revived and supplemented through studying criminal law, framing indictments, examining witnesses, and

addressing judge and jury,—all this under the supervision of the scholarly District Attorney, John Wilder May, whose treatises are still in high repute. Also, to Storey's practical acquaintance with the machinery and methods of national government was now added practical familiarity with the machinery and methods of state and municipal governments; this made it awkwardly unreasonable for opponents of his later career as a public critic to contend that in governmental matters he was a mere amateur. That useful episode of informal education in the District Attorney's office came to an end in May, 1871.

Upon leaving the District Attorney's office, Storey entered general practice, first with his father, Charles William Storey, and then—apparently in October, 1871,—with his old friends, Brooks and Ball; but he soon added to general practice the burden of being, out of hours, so to speak, an editor of *The American Law Review*, a Boston quarterly of high standing throughout the United States. He had written an article for that magazine in his law school days, and another article and some summaries of American decisions at later dates, probably in 1871 and 1872; and in 1872 the editors, on resigning, named Moorfield Storey and his friend Samuel Hoar to be their successors. Storey and Hoar retained the editorship until 1879. The seven volumes edited by them contain about six thousand pages. The space is rather evenly divided between technical and non-technical topics; for the digests of decisions and the book notices are almost wholly technical, while the lay reader would find himself wholly at home, both then and now, with the editorial discussions of current events and also with the articles from contributors,—for example, with the article contributed by Storey's father to the number for January, 1877, under the title "The Civil Service of the United States." An examination of any one of the volumes will richly repay any reader, and will show that the seven years of editorship may well be accounted the most profitable of the three episodes which, when combined, served as a useful, though informal, education both for Storey's career as a lawyer and for his non-professional career as a commentator on governmental problems.

So much for his preliminary and less known years; and now a very few words will suffice to indicate the essential features of that part of his life which was conspicuously lived in the view of a constantly

growing circle, and which is still remembered by thousands throughout the whole nation.

A skeleton of the facts is that Storey was in active practice for sixty years, that for the greater part of that time he was the senior member of one of the chief law firms in the country, that he was a specialist in examining witnesses and in addressing jurors and judges, that throughout his last fifty years and upwards, though one of the busiest of lawyers, he enthusiastically devoted a vast share of his time to the non-professional career of presenting, in newspapers, public addresses, private correspondence, and pamphlets, emphatic, though non-partisan, discussion of public men and of public measures. To name only three of those non-professional activities, he became successively and permanently interested in organizations for civil service reform, Philippine independence, and the advancement of the colored race, never wavering in his devotion to any of those three movements, and even at the end of his life being the most conspicuous force in each of the three.

Storey held laborious offices in many bodies. He was a member of the Harvard Board of Overseers for twenty-nine years, 1877–1888 and 1892–1919; president of the Boston Bar Association, the Massachusetts Bar Association, and the American Bar Association; and president of organizations promoting each of the three public reforms in which he was so deeply interested.

The published writings by Storey include a life of Charles Sumner, in the American Statesmen Series; a Memoir of Ebenezer Rockwood Hoar, in collaboration with Edward Waldo Emerson; a volume of Storrs Lectures delivered at the Yale Law School; a volume of Godkin Lectures delivered at Harvard College, pamphlets and contributions to periodicals. An excellent bibliography is appended to Dr. M. A. DeWolfe Howe's delightful volume entitled "Portrait of an Independent: Moorfield Storey."

Storey left a bulky mass of personal and political correspondence, newspaper clippings, and other material throwing an important sidelight on a long and exciting period of American history, and also showing in a very picturesque way the vastness of his non-professional activity. As to manuscripts and printed matter covering Storey's work of a professional nature, it must be said that what was done wholly by Storey himself can seldom be severed from what was done

with the coöperation of his numerous office associates. However, as his legal services in behalf of the negro were largely his personal work and were performed as an incident of his being treated throughout the United States as the adviser to be taken into conference in all negro cases, bringing to mind the old days when Salmon P. Chase was termed the attorney-general for the fugitive slaves, it will be only just to Storey as well as useful to the student of the race problem, to give the names of the three most important United States Supreme Court cases in which he was one of the counsel for the negro. They were Guinn *v.* United States, 238 U. S. 347 (1915), Buchanan *v.* Warley, 245 U. S. 60 (1917), and Moore *v.* Dempsey, 261 U. S. 86 (1923); and they may be briefly described as the cases wherein the Supreme Court overthrew the Oklahoma "grandfather clause," the Louisville segregation ordinance, and a verdict alleged to have been rendered by an Arkansas jury under mob domination.

Such being the facts as to Storey's career, many may ask how it was possible for him to accomplish so much and to accomplish it so well. A searching question, certainly not to be answered here. As yet there is no agreement upon this matter. Clearness, energy, persistence, versatility, idealism? Many a lawyer with all of those qualities has had no such career. Perhaps it may be useful to recall that by both Storey and his friends his chief characteristic was said to be a peculiar joyfulness in fighting for the under dog.

EUGENE WAMBAUGH

GEORGE WOODWARD WICKERSHAM (1858–1936)

Fellow in Class III, Section 1, 1931

George W. Wickersham was born at Pittsburgh, Pennsylvania, September 19, 1858, and died in New York, January 25, 1936. Wickersham was educated for two years at Lehigh University, left college and took his bachelor's degree in the Law School of the University of Pennsylvania in 1880. Later in his life he received the degree of LL.B. from Lehigh (1909), Harvard (1921), Hobart (1922), and the University of Michigan (1927).

On graduation from the law school he at once entered practice in Philadelphia, but after two years he went to New York, and in 1887 he became a partner in the important firm of Strong & Cadwallader.

In 1909–1913 he was Attorney General of the United States. After this public service he returned to his New York office which then became Cadwallader, Wickersham, and Taft, and remained in this practice until 1936. Throughout his active life he held many positions of trust at the Bar and in his own state. He was chairman of President Hoover's Commission on Law Observance and Enforcement, and took an active part in the conclusions of the committee. He was a member of the General Conventions of the Protestant Episcopal Church from 1925 to 1931. He was president of the American Law Institute from its foundation until his death, and took a deep interest and an important and useful part in its work.

Mr. Wickersham was intensely active about his work, whatever he may have been doing at the time. He was unusually quick to see and to formulate an issue, and his usefulness in conference lay in this quality. His formulation of the question and his solution of it usually met with success. As one of the Board of Visitors to the Harvard Law School he was trenchant in suggestion, and greatly assisted with his counsel. One may say that his chief characteristic was usefulness. He seldom engaged in any enterprise which he did not greatly assist with his insight, his readiness and counsel, and his skill in suggestion.

JOSEPH H. BEALE

American Academy of Arts and Sciences.

OFFICERS AND COMMITTEES FOR 1936-1937.

PRESIDENT.

ROSCOE POUND.

VICE-PRESIDENTS.

Class I.
JAMES F. NORRIS,

Class II.
WALTER B. CANNON,

Class III.
GEORGE GRAFTON WILSON,

Class IV.
ARTHUR S. PEASE.

CORRESPONDING SECRETARY.

TENNEY L. DAVIS.

RECORDING SECRETARY.

WALTER EUGENE CLARK.

TREASURER.

INGERSOLL BOWDITCH.

LIBRARIAN.

HERVEY W. SHIMER.

EDITOR.

WILLIAM C. GREENE.

COUNCILLORS.

Class I.

JOHN C. SLATER,
Terms expire 1937.

WILLIAM C. GRAUSTEIN,
Terms expire 1938.

DUGALD C. JACKSON,
Terms expire 1939.

LAWRENCE J. HENDERSON,
Terms expire 1940.

Class II.

JOHN W. M. BUNKER.

KIRK BRYAN.

RALPH H. WETMORE.

HANS ZINSSER.

Class III.

JOHN H. WILLIAMS,
Terms expire 1937.

JOSEPH H. BEALE,
Terms expire 1938.

ARTHUR N. HOLCOMBE,
Terms expire 1939.

JOHN A. COUSENS,
Terms expire 1940.

Class IV.

WILLIAM C. GREENE.

EDGAR S. BRIGHTMAN.

KENNETH J. CONANT.

JOSHUA WHATMOUGH.

COMMITTEE OF FINANCE.

THOMAS BARBOUR, PAUL J. SACHS, ALFRED L. RIPLEY.

RUMFORD COMMITTEE.

HARLOW SHAPLEY, *Chairman*,

ELIHU THOMSON, HARRY M. GOODWIN, NORTON A. KENT,
PERCY W. BRIDGMAN, CHARLES L. NORTON, GEORGE W. PIERCE.

C. M. WARREN COMMITTEE.

JAMES F. NORRIS, *Chairman*,

GREGORY P. BAXTER, FREDERICK G. KEYES, CHARLES A. KRAUS,
WALTER L. JENNINGS, REID HUNT, TENNEY L. DAVIS.

COMMITTEE OF PUBLICATION.

WILLIAM C. GREENE, *Chairman*,

EDWIN C. KEMBLE, of Class I, JOSEPH H. BEALE, of Class III,
FREDERIC T. LEWIS, of Class II, ROBERT P. BLAKE, of Class IV.

COMMITTEE ON THE LIBRARY.

HERVEY W. SHIMER, *Chairman*,

RAYMOND C. ARCHIBALD, of Class I, NATHAN ISAACS, of Class III,
THOMAS BARBOUR, of Class II, HENRY B. WASHBURN, of Class IV.

AUDITING COMMITTEE.

GEORGE R. AGASSIZ, ALEXANDER FORBES.

HOUSE COMMITTEE.

S. BURT WOLBACH, *Chairman*,

WILLIAM H. LAWRENCE, ROBERT P. BIGELOW, JEROME C. HUNSAKER.

COMMITTEE ON BIOGRAPHICAL NOTICES.

DAVIS R. DEWEY, *Chairman*,

JAMES F. NORRIS, JOSEPH H. BEALE,
ALFRED C. LANE, SAMUEL E. MORISON,

WALTER EUGENE CLARK.

COMMITTEE ON MEETINGS.

THE PRESIDENT,
THE RECORDING SECRETARY,

HARLOW SHAPLEY, LEIGH HOADLEY, ABBOTT P. USHER,
JOSHUA WHATMOUGH.

LIST

OF THE

FELLOWS AND FOREIGN HONORARY MEMBERS

(Corrected to July 1, 1936)

FELLOWS—796

(Number limited to eight hundred)

The year of election is indicated in the left margin, the century being omitted; thus 21 means 1921, 92 means 1892. When a Fellow resigned and was re-elected, the year of re-election is indicated in the ordinary way, the year of election is enclosed in square brackets. The year of election of an Associate, now a Fellow, is indicated by round brackets.

CLASS I—*Mathematical and Physical Sciences*—213

SECTION 1—*Mathematics and Astronomy*—53

21 Charles Greeley Abbot . . . . . Washington, D. C.
32 Clarence Raymond Adams . . . . . Providence, R. I.
22 Walter Sydney Adams . . . . . Pasadena, Cal.
12 George Russell Agassiz . . . . . Boston
17 Raymond Clare Archibald . . . . . Providence, R. I.
32 Albert Arnold Bennett . . . . . Providence, R. I.
13 George David Birkhoff . . . . . Cambridge
35 Gilbert Ames Bliss . . . . . Chicago, Ill.
12 Ernest William Brown . . . . . New Haven, Conn.
11 William Wallace Campbell . . . . . San Francisco, Cal.
13 Julian Lowell Coolidge . . . . . Cambridge
15 Leonard Eugene Dickson . . . . . Chicago, Ill.
33 Jesse Douglas . . . . . Cambridge
34 Griffith Conrad Evans . . . . . Berkeley, Cal.
15 Philip Fox . . . . . Evanston, Ill.

92 Fabian Franklin . . . . . New York, N. Y.
30 Philip Franklin . . . . . Belmont
24 William Caspar Graustein . . . . . Cambridge
32 Einar Hille . . . . . New Haven, Conn.
15 Frank Lauren Hitchcock . . . . . Belmont
13 Edward Vermilye Huntington . . . . . Cambridge
15 Dunham Jackson . . . . . Minneapolis, Minn.
15 Carl Otto Lampland . . . . . Flagstaff, Ariz.
25 Willem Jacob Luyten . . . . . Minneapolis, Minn.
34 Donald Howard Menzel . . . . . Cambridge
19 George Abram Miller . . . . . Urbana, Ill.
24 John Anthony Miller . . . . . Swarthmore, Pa.
23 Samuel Alfred Mitchell . . . . . University, Va.
17 Frank Morley . . . . . Baltimore, Md.
29 Marston Morse . . . . . Princeton, N. J.
19 Forest Ray Moulton . . . . . Chicago, Ill.
18 Henry Bayard Phillips . . . . . Belmont
[83] 99 William Henry Pickering . Mandeville, Jamaica, B. W. I.
96 Charles Lane Poor . . . . . New York, N. Y.
14 Roland George Dwight Richardson . . . . Providence, R. I.
21 Henry Norris Russell . . . . . Princeton, N. J.
31 George Rutledge . . . . . Belmont
21 Frank Schlesinger . . . . . New Haven, Conn.
20 Harlow Shapley . . . . . Cambridge
09 Vesto Melvin Slipher . . . . . Flagstaff, Ariz.
17 Frederick Slocum . . . . . Middletown, Conn.
19 Virgil Snyder . . . . . Ithaca, N. Y.
21 Joel Stebbins . . . . . Madison, Wis.
27 Harlan True Stetson . . . . . Waban
33 Marshall Harvey Stone . . . . . Cambridge
30 Dirk Jan Struik . . . . . Belmont
28 Jacob David Tamarkin . . . . . Providence, R. I.
02 Harry Walter Tyler . . . . . Washington, D. C.
23 Oswald Veblen . . . . . Princeton, N. J.
29 Joseph Leonard Walsh . . . . . Cambridge
25 Alfred North Whitehead . . . . . Cambridge
32 David Vernon Widder . . . . . Cambridge
12 Frederick Shenstone Woods . . . . . Newton Center

CLASS I, SECTION II—*Physics*—62

28	Adelbert Ames, Jr.	Hanover, N. H.
11	Joseph Sweetman Ames	Baltimore, Md.
21	Samuel Jackson Barnett	Los Angeles, Cal.
12	Percy William Bridgman	Cambridge
26	Walter Guyton Cady	Middletown, Conn.
03	George Ashley Campbell	New York, N. Y.
21	Leslie Lyle Campbell	Cambridge
16	Emory Leon Chaffee	Belmont
28	Arthur Holly Compton	Chicago, Ill.
31	Karl Taylor Compton	Cambridge
12	Daniel Frost Comstock	Cambridge
15	William David Coolidge	Schenectady, N. Y.
34	Franzo Hazlett Crawford	Williamstown
13	Henry Crew	Evanston, Ill.
11	Harvey Nathaniel Davis	Hoboken, N. J.
29	Clinton Joseph Davisson	New York, N. Y.
12	Arthur Louis Day	Washington, D. C.
14	William Johnson Drisko	Addison, Me.
01	Alexander Wilmer Duff	Worcester
09	Arthur Woolsey Ewell	Worcester
97	Harry Manley Goodwin	Brookline
01	George Ellery Hale	Pasadena, Cal.
83	Edwin Herbert Hall	Cambridge
29	Arthur Cobb Hardy	Wellesley
31	George Russell Harrison	Belmont
95	Hammond Vinton Hayes	Boston
14	John Charles Hubbard	Baltimore, Md.
17	Gordon Ferrie Hull	Hanover, N. H.
14	Charles Clifford Hutchins	Brunswick, Me.
21	Frederic Eugene Ives	Philadelphia, Pa.
14	James Edmund Ives	Washington, D. C.
22	Edwin Crawford Kemble	Cambridge
13	Norton Adams Kent	Newton Center
97	Frank Arthur Laws	Brookline
99	Henry Lefavour	Boston
31	Robert Bruce Lindsay	Providence, R. I.
01	Theodore Lyman	Brookline

34 Louis Williams McKeehan . . . . . New Haven, Conn.
14 Ernest George Merritt . . . . . Ithaca, N. Y.
14 Dayton Clarence Miller . . . . . Cleveland, O.
14 Robert Andrews Millikan . . . . . Pasadena, Cal.
34 Harry Rowe Mimno . . . . . Cambridge
34 Philip McCord Morse . . . . . Belmont
01 Edward Leamington Nichols. . . . . Ithaca, N. Y.
07 Charles Ladd Norton. . . . . Boston
31 Otto Oldenberg . . . . . Cambridge
34 Leigh Page. . . . . New Haven, Conn.
07 George Washington Pierce . . . . . Cambridge
35 Floyd Karker Richtmyer . . . . . Ithaca, N. Y.
16 Frederick Albert Saunders . . . . . Cambridge
27 John Clarke Slater . . . . . Cambridge
96 John Stone Stone. . . . . San Diego, Cal.
12 Maurice DeKay Thompson . . . . . Brookline
88 Elihu Thomson . . . . . Swampscott
28 Manuel Sandoval Vallarta . . . . . Brookline
35 Robert Jemison Van de Graaff . . . . . Cambridge
34 John Hasbrouck Van Vleck . . . . . Cambridge
35 Bertram Eugene Warren. . . . . Cambridge
18 David Locke Webster . . . . . Palo Alto, Cal.
11 Edwin Bidwell Wilson . . . . . Brookline
13 Robert Williams Wood . . . . . Baltimore, Md.
17 John Zeleny . . . . . New Haven, Conn.

CLASS I, SECTION III—*Chemistry*—53

26 Roger Adams . . . . . Urbana, Ill.
13 Wilder Dwight Bancroft. . . . . Ithaca, N. Y.
07 Gregory Paul Baxter. . . . . Cambridge
29 James Alexander Beattie. . . . . Belmont
19 Arthur Alphonzo Blanchard. . . . . Brookline
14 Marston Taylor Bogert . . . . . New York, N. Y.
36 Harold Simmons Booth . . . . . Cleveland, O.
11 William Crowell Bray . . . . . Berkeley, Cal.
12 Russell Henry Chittenden . . . . . New Haven, Conn.
24 James Bryant Conant . . . . . Cambridge
23 Tenney Lombard Davis . . . . . Norwell

09 Henry Fay . . . . . Brookline
33 Louis Frederick Fieser . . . . . Waltham
15 George Shannon Forbes . . . . . Cambridge
21 Edward Curtis Franklin . . . . . Palo Alto, Cal.
28 Louis John Gillespie . . . . . Somerville
35 Louis Harris . . . . . Cambridge
36 Albert Baird Hastings . . . . . Cambridge
12 Lawrence Joseph Henderson . . . . . Cambridge
36 Ernest Hamlin Huntress . . . . . Melrose Highlands
97 Walter Louis Jennings . . . . . Worcester
18 Grinnell Jones . . . . . Cambridge
19 Frederick George Keyes . . . . . Cambridge
33 George Bogdan Kistiakowsky . . . . . Cambridge
14 Elmer Peter Kohler . . . . . Cambridge
15 Charles August Kraus . . . . . Providence, R. I.
14 Arthur Becket Lamb . . . . . Brookline
18 Irving Langmuir . . . . . Schenectady, N. Y.
09 Gilbert Newton Lewis . . . . . Berkeley, Cal.
15 Warren Kendall Lewis . . . . . Newton
23 Duncan Arthur MacInnes . . . . . New York, N. Y.
32 Kenneth Lamartine Mark . . . . . Boston
35 Nicholas Athanasius Milas . . . . . Belmont
36 Avery Adrian Morton . . . . . Watertown
19 Edward Mueller . . . . . Cambridge
91 Charles Edward Munroe . . . . . Forest Glen, Md.
07 James Flack Norris . . . . . Boston
13 William Albert Noyes . . . . . Urbana, Ill.
31 William Albert Noyes, Jr. . . . . Providence, R. I.
14 Samuel Cate Prescott . . . . . Brookline
79 Robert Hallowell Richards . . . . . Jamaica Plain
14 Martin André Rosanoff . . . . . Pittsburgh, Pa.
28 George Scatchard . . . . . Cambridge
32 Walter Cecil Schumb . . . . . East Milton
15 Miles Standish Sherrill . . . . . Brookline
20 Harry Monmouth Smith . . . . . Brookline
34 Leighton Bruerton Smith . . . . . Beverly
14 Julius Oscar Stieglitz . . . . . Chicago, Ill.
22 Richard Chace Tolman . . . . . Pasadena, Cal.

11 Willis Rodney Whitney . . . . . Schenectady, N. Y.
19 Robert Seaton Williams . . . . . Belmont
19 Alpheus Grant Woodman . . . . . Watertown
34 David Elbridge Worrall . . . . . Medford

CLASS I, SECTION IV—*Technology and Engineering*—45

06 Comfort Avery Adams . . . . . Philadelphia, Pa.
33 Harold Kilbrith Barrows . . . . . Winchester
31 Charles Harold Berry . . . . . Belmont
25 Vannevar Bush . . . . . Belmont
02 Harry Ellsworth Clifford . . . . . Newton Center
34 Otto Gustav Colbiornsen Dahl . . . . . Brookline
34 Chester Laurens Dawes . . . . . Cambridge
34 Jacob Pieter Den Hartog . . . . . Wellesley Hills
20 Theodore Harwood Dillon . . . . . Brookline
27 Philip Drinker . . . . . Newton Center
22 Gano Dunn . . . . . New York, N. Y.
21 William Frederick Durand . . . . . Palo Alto, Cal.
27 Gordon Maskew Fair . . . . . Cambridge
19 Frederic Harold Fay . . . . . Boston
32 Glennon Gilboy . . . . . Lincoln
32 Albert Haertlein . . . . . Watertown
36 Murray Philip Horwood . . . . . Newton Center
23 William Hovgaard . . . . . Brooklyn, N. Y.
34 Jerome Clarke Hunsaker . . . . . Boston
23 James Robertson Jack . . . . . Watertown
11 Dugald Caleb Jackson . . . . . Cambridge
30 Frank Baldwin Jewett . . . . . New York, N. Y.
01 Lewis Jerome Johnson . . . . . Cambridge
05 Arthur Edwin Kennelly . . . . . Cambridge
32 Ralph Restieaux Lawrence . . . . . Belmont
23 William Henry Lawrence . . . . . Jamaica Plain
21 Charles Thomas Main . . . . . Winchester
12 Lionel Simeon Marks . . . . . Cambridge
34 Edward Leyburn Moreland . . . . . Wellesley
33 Arthur Edwin Norton . . . . . Cambridge
20 Frederick Law Olmsted . . . . . Brookline
15 Charles Francis Park . . . . . Taunton

28 Langdon Pearse . . . . . Chicago, Ill.
13 Harold Pender . . . . . Philadelphia, Pa.
30 Greenleaf Whittier Pickard . . . . . Newton Center
30 George Edmond Russell . . . . . Bedford
03 Albert Sauveur . . . . . Cambridge
01 Henry Lloyd Smyth . . . . . Windsor, Vt.
14 Charles Milton Spofford . . . . . Boston
28 John F. Stevens . . . . . Baltimore, Md.
23 Edward Pearson Warner . . . . . New York, N. Y.
29 Arthur Edward Wells . . . . . New York, N. Y.
27 Robert Spurr Weston . . . . . Brookline
33 Frank Edward Winsor . . . . . West Newton
15 Joseph Ruggles Worcester . . . . . Waltham

Class II—*Natural and Physiological Sciences*—217

Section I—*Geology, Mineralogy, and Physics of the Globe*—53

15 Wallace Walter Atwood . . . . . Worcester
21 Norman Levi Bowen . . . . . Washington, D. C.
16 Isaiah Bowman . . . . . Baltimore, Md.
33 Charles Franklin Brooks . . . . . Milton
29 Kirk Bryan . . . . . Cambridge
33 Frank Morton Carpenter . . . . . Newtonville
93 Henry Helm Clayton . . . . . Canton
09 Reginald Aldworth Daly . . . . . Cambridge
35 Oliver Lanard Fassig . . . . . San Juan, P. R.
34 Sterling Price Fergusson . . . . . Milton
18 William Ebenezer Ford . . . . . New Haven, Conn.
17 James Walter Goldthwait . . . . . Hanover, N. H.
14 Louis Caryl Graton . . . . . Cambridge
17 Herbert Ernest Gregory . . . . . Honolulu, T. H.
21 William Jackson Humphreys . . . . . Washington, D. C.
16 Ellsworth Huntington . . . . . New Haven, Conn.
95 Robert Tracy Jackson . . . . . Peterborough, N. H.
02 Thomas Augustus Jaggar . . . . . Honolulu, T. H.
08 Douglas Wilson Johnson . . . . . New York, N. Y.
21 Arthur Keith . . . . . Washington, D. C.
10 Alfred Church Lane . . . . . Cambridge

25 Esper Signius Larsen, Jr. . . . . Belmont
15 Andrew Cowper Lawson . . . . . Berkeley, Cal.
16 Charles Kenneth Leith . . . . . Madison, Wis.
12 Waldemar Lindgren . . . . . Brookline
17 Frederic Brewster Loomis . . . . . Amherst
17 Alexander George McAdie . . . . . Hampton, Va.
31 George Francis McEwen . . . . . La Jolla, Cal.
27 Donald Hamilton McLaughlin . . . . . Cambridge
25 Kirtley Fletcher Mather . . . . . Newton Center
26 Edward Bennett Mathews . . . . . Baltimore, Md.
35 Warren Judson Mead . . . . . Cambridge
21 John Campbell Merriam . . . . . Washington, D. C.
17 William John Miller . . . . . Los Angeles, Cal.
32 Frederick Kuhne Morris . . . . . Cambridge
34 Walter Harry Newhouse . . . . . Medford
03 Charles Palache . . . . . Cambridge
17 Percy Edward Raymond . . . . . Lexington
22 Austin Flint Rogers . . . . . Palo Alto, Cal.
34 Carl-Gustaf Arvid Rossby . . . . . Hingham
15 Robert Wilcox Sayles . . . . . Chestnut Hill
19 Waldemar Theodore Schaller . . . . . Washington, D. C.
15 Charles Schuchert . . . . . New Haven, Conn.
12 William Berryman Scott . . . . . Princeton, N. J.
11 Hervey Woodburn Shimer . . . . . Hingham
25 Frank Bursley Taylor . . . . . Fort Wayne, Ind.
17 Thomas Wayland Vaughan . . . . . La Jolla, Cal.
08 Charles Hyde Warren . . . . . New Haven, Conn.
14 Herbert Percy Whitlock . . . . . New York, N. Y.
35 Derwent Stainthorpe Whittlesey . . . . . Cambridge
15 Bailey Willis . . . . . Palo Alto, Cal.
95 John Eliot Wolff . . . . . Pasadena, Cal.
15 Frederick Eugene Wright . . . . . Washington, D. C.

CLASS II, SECTION II—*Botany*—36

30 LeRoy Abrams . . . . . Stanford University, Cal.
11 Oakes Ames . . . . . North Easton
34 Edgar Anderson . . . . . St. Louis, Mo.
23 Joseph Charles Arthur . . . . . Lafayette, Ind.

15 Irving Widmer Bailey . . . . . Cambridge
00 Liberty Hyde Bailey . . . . . Ithaca, N. Y.
21 Edward Wilber Berry . . . . . Baltimore, Md.
98 Douglas Houghton Campbell . . . . . Palo Alto, Cal.
14 George Perkins Clinton . . . . . New Haven, Conn.
16 Bradley Moore Davis . . . . . Ann Arbor, Mich.
35 Bernard Ogilvie Dodge . . . . . New York, N. Y.
11 Edward Murray East . . . . . Jamaica Plain
21 Rollins Adams Emerson . . . . . Ithaca, N. Y.
12 Alexander William Evans . . . . . New Haven, Conn.
29 Joseph Horace Faull . . . . . Cambridge
00 Merritt Lyndon Fernald . . . . . Newton
11 Robert Almer Harper . . . . . New York, N. Y.
98 John George Jack . . . . . East Walpole
28 Willis Linn Jepson . . . . . Berkeley, Cal.
27 Ivan Murray Johnston . . . . . Brookline
34 Donald Forsha Jones . . . . . New Haven, Conn.
21 Jacob Goodale Lipman . . . . . New Brunswick, N. J.
14 Burton Edward Livingston . . . . . Baltimore, Md.
21 Elmer Drew Merrill . . . . . Cambridge
10 Winthrop John Vanleuven Osterhout . . . . New York, N. Y.
27 George James Peirce . . . . . Palo Alto, Cal.
14 Alfred Rehder . . . . . Jamaica Plain
30 Karl Sax . . . . . Jamaica Plain
16 William Albert Setchell . . . . . Berkeley, Cal.
34 Edmund Ware Sinnott . . . . . New York, N. Y.
34 Gilbert Morgan Smith . . . . . Stanford University, Cal.
23 Elvin Charles Stakman . . . . . St. Paul, Minn.
92 William Trelease . . . . . Urbana, Ill.
31 Charles Alfred Weatherby . . . . . Cambridge
22 William Henry Weston, Jr. . . . . Cambridge
32 Ralph Hartley Wetmore . . . . . Belmont

CLASS II, SECTION III—*Zoology and Physiology*—72

22 Nathan Banks . . . . . Jamaica Plain
16 Thomas Barbour . . . . . Boston
33 Philip Bard . . . . . Baltimore, Md.
09 Francis Gano Benedict . . . . . Boston

11 Henry Bryant Bigelow . . . . . Concord
14 Robert Payne Bigelow . . . . . Brookline
35 Charles Henry Blake . . . . . Cambridge
20 William T. Bovie . . . . . Bar Harbor, Me.
24 Edward Allen Boyden . . . . . Minneapolis, Minn.
16 John Lewis Bremer . . . . . Boston
15 Charles Thomas Brues . . . . . Jamaica Plain
28 John Wymond Miller Bunker . . . . . Belmont
06 Walter Bradford Cannon . . . . . Cambridge
22 Thorne Martin Carpenter . . . . . Boston
00 William Ernest Castle . . . . . Berkeley, Cal.
14 Charles Value Chapin . . . . . Providence, R. I.
29 Lemuel Roscoe Cleveland . . . . . Jamaica Plain
26 Edwin Joseph Cohn . . . . . Cambridge
14 Edwin Grant Conklin . . . . . Princeton, N. J.
23 Manton Copeland . . . . . Brunswick, Me.
27 William John Crozier . . . . . Cambridge
17 Joseph Augustine Cushman . . . . . Sharon
35 J[ohn] Frank[lin] Daniel . . . . . Berkeley, Cal.
95 Charles Benedict Davenport . . Cold Spring Harbor, N. Y.
29 Hallowell Davis . . . . . Belmont
33 Alden Benjamin Dawson . . . . . Belmont
25 Samuel Randall Detwiler . . . . . New York, N. Y.
25 Herbert McLean Evans . . . . . Berkeley, Cal.
30 Henry Clinton Fall . . . . . Tyngsboro
34 Cyrus Hartwell Fiske . . . . . Belmont
15 Alexander Forbes . . . . . Milton
34 John Farquhar Fulton . . . . . New Haven, Conn.
31 William King Gregory . . . . . New York, N. Y.
29 Joseph Grinnell . . . . . Berkeley, Cal.
89 Samuel Henshaw . . . . . Cambridge
36 Frederick Lee Hisaw . . . . . Cambridge
29 Leigh Hoadley . . . . . Cambridge
34 Hudson Hoagland . . . . . Worcester
24 Samuel Jackson Holmes . . . . . Berkeley, Cal.
28 Roy Graham Hoskins . . . . . Waban
13 Leland Ossian Howard . . . . . Washington, D. C.
14 Herbert Spencer Jennings . . . . . Baltimore, Md.

13 Charles Atwood Kofoid . . . . . Berkeley, Cal.
16 Frederic Thomas Lewis . . . . . Waban
33 Frank Rattray Lillie . . . . . Chicago, Ill.
14 Ralph Stayner Lillie . . . . . Chicago, Ill.
17 Richard Swann Lull . . . . . New Haven, Conn.
84 Edward Laurens Mark . . . . . Cambridge
15 Albert Davis Mead . . . . . Providence, R. I.
27 Axel Leonard Melander . . . . . New York, N. Y.
35 Karl Friedrich Meyer . . . . . San Francisco, Cal.
21 Gerrit Smith Miller . . . . . Washington, D. C.
28 Thomas Hunt Morgan . . . . . Pasadena, Cal.
14 Herbert Vincent Neal . . . . . Tufts College
95 George Howard Parker . . . . . Cambridge
19 Raymond Pearl . . . . . Baltimore, Md.
15 John Charles Phillips . . . . . Wenham
21 Henry Augustus Pilsbry . . . . . Philadelphia, Pa.
27 Frederick Haven Pratt . . . . . Wellesley Hills
09 Herbert Wilbur Rand . . . . . Belmont
32 David Rapport . . . . . Cambridge
23 Alfred Clarence Redfield . . . . . Milton
34 Alfred Newton Richards . . . . . Philadelphia, Pa.
34 Oscar Riddle . . . . . Cold Spring Harbor, N. Y.
13 William Emerson Ritter . . . . . Berkeley, Cal.
25 Alexander Grant Ruthven . . . . . Ann Arbor, Mich.
16 Percy Goldthwait Stiles . . . . . Newtonville
15 Arthur Wisswald Weysse . . . . . Boston
09 William Morton Wheeler . . . . . Boston
02 Edmund Beecher Wilson . . . . . New York, N. Y.
15 Frederick Adams Woods . . . . . Rome, Italy
33 Jeffries Wyman, Jr. . . . . Chestnut Hill

CLASS II, SECTION IV—*Medicine and Surgery*—56

32 Joseph Charles Aub . . . . . Belmont
36 Oswald Theodore Avery . . . . . New York, N. Y.
29 James Bourne Ayer . . . . . Milton
(28) 32 Franklin Greene Balch . . . . . Boston
31 George Blumer . . . . . New Haven, Conn.
36 Charles Sidney Burwell . . . . . Brookline

21	Charles Macfie Campbell	Cambridge
19	Alexis Carrel	New York, N. Y.
31	William Bosworth Castle	Brookline
30	David Cheever	Boston
13	Henry Asbury Christian	Brookline
21	Rufus Cole	New York, N. Y.
14	Harvey Cushing	New Haven, Conn.
32	Elliott Carr Cutler	Brookline
31	Eugene Floyd DuBois	New York, N. Y.
33	Reginald Fitz	Brookline
11	Simon Flexner	New York, N. Y.
27	James Lawder Gamble	Brookline
22	Joseph Lincoln Goodale	Boston
18	Robert Battey Greenough	Brookline
21	Ross Granville Harrison	New Haven, Conn.
27	Percy Rogers Howe	Belmont
21	William Henry Howell	Baltimore, Md.
33	Edgar Erskine Hume	Washington, D. C.
15	Reid Hunt	Boston
34	Henry Jackson, Jr.	Chestnut Hill
12	Elliott Proctor Joslin	Boston
23	Roger Irving Lee	Brookline
29	Edwin Allen Locke	Williamstown
28	Warfield Theobald Longcope	Baltimore, Md.
32	Fred Bates Lund	Newton
33	George Burgess Magrath	Boston
13	Frank Burr Mallory	Brookline
21	William James Mayo	Rochester, Minn.
34	Leroy Matthew Simpson Miner	Newtonville
26	George Richards Minot	Brookline
28	William Lorenzo Moss	Augusta, Ga.
28	John Howard Mueller	West Roxbury
25	Robert Bayley Osgood	Boston
27	Joseph Hershey Pratt	Boston
35	Tracy Jackson Putnam	Brookline
34	William Carter Quinby	Brookline
34	Arthur Hiler Ruggles	Providence, R. I.
27	Andrew Watson Sellards	Boston

33 George Cheever Shattuck . . . . . Brookline
30 Torald Hermann Sollmann . . . . . Cleveland, Ohio
21 Charles Wardell Stiles . . . . . Washington, D. C.
14 Richard Pearson Strong . . . . . Boston
30 Fritz Bradley Talbot . . . . . Brookline
14 Ernest Edward Tyzzer . . . . . Wakefield
14 Frederick Herman Verhoeff . . . . . Brookline
27 Joseph Treloar Wearn . . . . . Cleveland, Ohio
33 Soma Weiss . . . . . Cambridge
25 Benjamin White . . . . . New York, N. Y.
12 Simeon Burt Wolbach . . . . . South Sudbury
23 Hans Zinsser . . . . . Boston

Class III—*The Social Arts*—160

Section I—*Jurisprudence*—41

31 George Weston Anderson . . . . . Boston
(24) 32 Francis Noyes Balch . . . . . Jamaica Plain
06 Joseph Henry Beale . . . . . Cambridge
36 Stoughton Bell . . . . . Cambridge
33 Harry Augustus Bigelow . . . . . Chicago, Ill.
33 Henry Wolf Biklé . . . . . Philadelphia, Pa.
36 Wilfred Bolster . . . . . Brookline
36 Claude Raymond Branch . . . . . Providence, R. I.
33 Benjamin Nathan Cardozo . . . . . Washington, D. C.
36 Charles Thornton Davis . . . . . Marblehead
33 John Dickinson . . . . . Washington, D. C.
31 Fred Tarbell Field . . . . . Newton
32 Felix Frankfurter . . . . . Cambridge
30 Thomas Hovey Gage . . . . . Worcester
33 Theodore Francis Green . . . . . Providence, R. I.
32 Walter Perley Hall . . . . . Fitchburg
33 Learned Hand . . . . . New York, N. Y.
18 Charles Evans Hughes . . . . . Washington, D. C.
31 Nathan Isaacs . . . . . Cambridge
32 Eldon Revare James . . . . . Cambridge
21 Frederick Lawton . . . . . Boston
32 Sayre Macneil . . . . . Azusa, Cal.

32 Calvert Magruder . . . . . Cambridge
31 William DeWitt Mitchell . . . . . New York, N. Y.
31 Edmund Morris Morgan . . . . . Arlington
31 Herbert Parker . . . . . South Lancaster
36 Philip Stanley Parker . . . . . Brookline
36 Henry Parkman, Jr. . . . . Boston
01 George Wharton Pepper . . . . . Philadelphia, Pa.
11 Roscoe Pound . . . . . Watertown
36 Stanley Elroy Qua . . . . . Lowell
12 Elihu Root . . . . . New York, N. Y.
12 Arthur Prentice Rugg . . . . . Worcester
32 Francis Bowes Sayre . . . . . Washington, D. C.
21 Austin Wakeman Scott . . . . . Cambridge
35 James Brown Scott . . . . . Washington, D. C.
36 Sidney Post Simpson . . . . . Cambridge
33 Harlan Fiske Stone . . . . . Washington, D. C.
32 Edward Sampson Thurston . . . . . Cambridge
14 Eugene Wambaugh . . . . . Cambridge
(28) 32 Edmund Allen Whitman . . . . . Cambridge

CLASS III, SECTION II—*Government, International Law, and Diplomacy*—28

36 Howard Landis Bevis . . . . . Cambridge
33 George Hubbard Blakeslee . . . . . Worcester
33 Edwin Montefiore Borchard . . . . . New Haven, Conn.
32 William Richards Castle, Jr. . . . . Washington, D. C.
32 Joseph Perkins Chamberlain . . . . . New York, N. Y.
33 Robert Treat Crane . . . . . New York, N. Y.
35 Tyler Dennett . . . . . Williamstown
31 Sidney Bradshaw Fay . . . . . Cambridge
27 William Cameron Forbes . . . . . Norwood
34 Edgar Stephenson Furniss . . . . . New Haven, Conn.
32 Joseph Clark Grew . . . . . Tokyo, Japan
35 Charles Grove Haines . . . . . Los Angeles, Cal.
16 Albert Bushnell Hart . . . . . Cambridge
27 Arthur Norman Holcombe . . . . . Cambridge
31 Manley Ottmer Hudson . . . . . Cambridge
32 Philip Carryl Jessup . . . . . New York, N. Y.
36 Morris Bryan Lambie . . . . . Cambridge

97 Abbott Lawrence Lowell . . . . . Boston
18 William MacDonald . . . . . New York, N. Y.
32 Charles Edward Merriam . . . . . Chicago, Ill.
32 Ogden Livingston Mills . . . . . New York, N. Y.
19 John Bassett Moore . . . . . New York, N. Y.
13 William Bennett Munro . . . . . Pasadena, Cal.
27 Westal Woodbury Willoughby . . . . . Washington, D. C.
32 William Franklin Willoughby . . . . . Washington, D. C.
14 George Grafton Wilson . . . . . Cambridge
27 Quincy Wright . . . . . Chicago, Ill.
33 Henry Aaron Yeomans . . . . . Cambridge

CLASS III, SECTION III—*Economics and Sociology*—61

36 James Waterhouse Angell . . . . . New York, N. Y.
36 James Cummings Bonbright . . . . . New York, N. Y.
33 Harold Hitchings Burbank . . . . . Cambridge
36 Philip Cabot . . . . . Milton
36 Edward Hastings Chamberlin . . . . . Cambridge
16 John Bates Clark . . . . . New York, N. Y.
34 John Maurice Clark . . . . . Westport, Conn.
28 Arthur Harrison Cole . . . . . Cambridge
31 Melvin Thomas Copeland . . . . . Cambridge
31 William Leonard Crum . . . . . Cambridge
32 William James Cunningham . . . . . Cambridge
34 Winthrop More Daniels . . . . . Saybrook Point, Conn.
21 Clive Day . . . . . New Haven, Conn.
13 Davis Rich Dewey . . . . . Cambridge
32 Arthur Stone Dewing . . . . . Newton
32 Wallace Brett Donham . . . . . Boston
34 John Franklin Ebersole . . . . . Belmont
36 Fred Rogers Fairchild . . . . . New Haven, Conn.
36 Frank Albert Fetter . . . . . Princeton, N. J.
12 Irving Fisher . . . . . New Haven, Conn.
31 James Ford . . . . . Cambridge
34 Ralph Evans Freeman . . . . . Cambridge
13 Edwin Francis Gay . . . . . San Marino, Cal.
33 Sheldon Glueck . . . . . Cambridge
34 Robert Murray Haig . . . . . New York, N. Y.

32 Henry Wyman Holmes . . . . . Cambridge
34 Edwin Walter Kemmerer . . . . . Princeton, N. J.
34 Frank Hyneman Knight . . . . . Chicago, Ill.
36 Roswell Cheney McCrea . . . . . New York, N. Y.
34 Robert Morison MacIver . . . . . New York, N. Y.
32 Walter Wallace McLaren . . . . . Williamstown
36 Malcolm Perrine McNair . . . . . Cambridge
32 Leon Carroll Marshall . . . . . Chevy Chase, Md.
33 Edward Sagendorph Mason . . . . . Cambridge
36 Elton Mayo . . . . . Cambridge
34 Richard Stockton Meriam . . . . . South Lincoln
34 Harry Alvin Millis . . . . . Chicago, Ill.
32 Frederick Cecil Mills . . . . . New York, N. Y.
31 Wesley Clair Mitchell . . . . . New York, N. Y.
34 Arthur Eli Monroe . . . . . Cambridge
32 Harold Glenn Moulton . . . . . Washington, D. C.
34 Edwin Griswold Nourse . . . . . Washington, D. C.
32 William Fielding Ogburn . . . . . Chicago, Ill.
33 Robert Ezra Park . . . . . Chicago, Ill.
28 Warren Milton Persons . . . . . Cambridge
32 Leo S. Rowe . . . . . Washington, D. C.
36 Thomas Henry Sanders . . . . . Cambridge
33 Josef Alois Schumpeter . . . . . Cambridge
32 Carl Snyder . . . . . New York, N. Y.
31 Pitirim Alexandrovich Sorokin . . . . . Winchester
31 Oliver Mitchell Wentworth Sprague . . . . . Cambridge
[89] 01 Frank William Taussig . . . . . Cambridge
34 Frederick John Teggart . . . . . Berkeley, Cal.
33 William Isaac Thomas . . . . . New York, N. Y.
31 Donald Skeele Tucker . . . . . Belmont
33 Abbott Payson Usher . . . . . Cambridge
34 Jacob Viner . . . . . Chicago, Ill.
32 John Henry Williams . . . . . Cambridge
36 Joseph Henry Willits . . . . . Swarthmore, Pa.
34 Leo Wolman . . . . . New York, N. Y.
34 Carle Clark Zimmerman . . . . . Winchester

CLASS III, SECTION IV—*Administration and Affairs*—30

(25) 32 Charles Francis Adams . . . . . Concord
(25) 32 Charles Foster Batchelder . . . . . Cambridge
24 Ingersoll Bowditch . . . . . Jamaica Plain
(26) 32 John Albert Cousens . . . . . Chestnut Hill
32 Henry Sturgis Dennison . . . . . Framingham
(28) 32 William Lusk Webster Field . . . . . Milton
16 Frank Johnson Goodnow . . . . . Baltimore, Md.
35 Jerome Davis Greene . . . . . Cambridge
(24) 32 Francis Russell Hart . . . . . Boston
(28) 32 Edward Jackson Holmes . . . . . Boston
34 Matt Bushnell Jones . . . . . Newton Center
34 Henry Plimpton Kendall . . . . . Walpole
(27) 32 Nathaniel Thayer Kidder . . . . . Milton
32 Thomas William Lamont . . . . . New York, N. Y.
34 Clarence Cook Little . . . . . Bar Harbor, Me.
36 Dumas Malone . . . . . Cambridge
33 James Vance May . . . . . Boston
(28) 31 Thomas Nelson Perkins . . . . . Westwood
(24) 32 Andrew James Peters . . . . . Jamaica Plain
02 Herbert Putnam . . . . . Washington, D. C.
(28) 32 Alfred Lawrence Ripley . . . . . Andover
34 Erwin Haskell Schell . . . . . Cambridge
35 Henry Lee Shattuck . . . . . Boston
(28) 32 Payson Smith . . . . . Brookline
33 Albert Warren Stearns . . . . . Billerica
(25) 32 Charles Henry Taylor . . . . . Boston
34 Charles Franklin Thwing . . . . . Cleveland, O.
36 Clair Elsmere Turner . . . . . Arlington
(24) 32 Edwin Sibley Webster . . . . . Brookline
(25) 32 Benjamin Loring Young . . . . . Weston

CLASS IV—*The Humanities*—206

SECTION I—*Theology, Philosophy, and Psychology*—51

32 Michael Joseph Ahern . . . . . Weston
33 Gordon Willard Allport . . . . . Cambridge
32 James Rowland Angell . . . . . New Haven, Conn.

33 John Gilbert Beebe-Center . . . . . Swampscott
24 Edwin Garrigues Boring . . . . . Cambridge
28 Edgar Sheffield Brightman . . . . . Newton
31 Henry Addington Bruce . . . . . Cambridge
32 Leonard Carmichael . . . . . Rochester, N. Y.
36 Robert Pierce Casey . . . . . Providence, R. I.
33 J(ames) McKeen Cattell . . . . . Garrison, N. Y.
32 George Croft Cell . . . . . Reading
28 Walter Fenno Dearborn . . . . . Cambridge
18 Edmund Burke Delabarre . . . . . Providence, R. I.
24 Raymond Dodge . . . . . Tryon, N. C.
33 Curt John Ducasse . . . . . Providence, R. I.
30 William Henry Paine Hatch . . . . . Cambridge
32 William Healy . . . . . Boston
10 William Arthur Heidel . . . . . Middletown, Conn.
21 William Ernest Hocking . . . . . Cambridge
35 Clark Leonard Hull . . . . . New Haven, Conn.
33 Walter Samuel Hunter . . . . . Providence, R. I.
17 Frederick John Foakes Jackson . . . . Englewood, N. J.
31 Truman Lee Kelley . . . . . Cambridge
28 Albert Cornelius Knudson . . . . . Cambridge
34 Kurt Koffka . . . . . Northampton
32 Karl Spencer Lashley . . . . . Belmont
13 William Lawrence . . . . . Boston
29 Clarence Irving Lewis . . . . . Lexington
33 Lee Sullivan McCollester . . . . . Tufts College
22 William McDougall . . . . . Durham, N. C.
10 Edward Caldwell Moore . . . . . Cambridge
31 Paul Elmer More . . . . . Princeton, N. J.
35 Henry Alexander Murray, Jr. . . . . Boston
32 Arthur Darby Nock . . . . . Cambridge
32 William Cardinal O'Connell . . . . . Boston
28 Johnson O'Connor . . . . . Boston
17 Charles Edwards Park . . . . . Boston
18 Leighton Parks . . . . . London, England
18 Francis Greenwood Peabody . . . . . Cambridge
33 Carroll Cornelius Pratt . . . . . Cambridge
30 James Hugh Ryan . . . . . Omaha, Neb.

31 Henry Knox Sherrill . . . . . Boston
27 Willard Learoyd Sperry . . . . . Cambridge
29 Russell Henry Stafford . . . . . Brookline
34 Lewis Madison Terman . . . . Stanford University, Cal.
34 Edward Lee Thorndike . . . . . New York, N. Y.
28 Henry Bradford Washburn . . . . . Cambridge
17 John Broadus Watson . . . . . New York, N. Y.
33 Frederic Lyman Wells . . . . . Newton Highlands
35 Robert Sessions Woodworth . . . . . New York, N. Y.
15 Robert Mearns Yerkes . . . . . New Haven, Conn.

CLASS IV, SECTION II—*History, Archæology, and Anthropology*—43

18 Charles McLean Andrews . . . . . New Haven, Conn.
28 James Phinney Baxter, 3d . . . . . Cambridge
23 Carl Lotus Becker . . . . . Ithaca, N. Y.
27 Robert Pierpont Blake . . . . . Cambridge
12 Franz Boas . . . . . New York, N. Y.
(25) 32 William Brooks Cabot . . . . . Boston
34 Clarence Gordon Campbell . . . . . New York, N. Y.
12 George Henry Chase . . . . . Cambridge
12 Wilberforce Eames . . . . . New York, N. Y.
21 Max Farrand . . . . . San Marino, Cal.
21 William Scott Ferguson . . . . . Cambridge
10 Worthington Chauncey Ford . . . . . Cambridge
33 Henry Thatcher Fowler . . . . . Providence, R. I.
18 Evarts Boutell Greene . . . . . New York, N. Y.
13 Charles Homer Haskins . . . . . Cambridge
19 Charles Downer Hazen . . . . . New York, N. Y.
14 Bert Hodge Hill . . . . . Athens, Greece
27 Earnest Albert Hooton . . . . . Cambridge
33 Halford Lancaster Hoskins . . . . . Tufts College
15 Aleš Hrdlička . . . . . Washington, D. C.
27 Alfred Vincent Kidder . . . . . Washington, D. C.
12 Alfred Louis Kroeber . . . . . Berkeley, Cal.
15 Kirsopp Lake . . . . . Cambridge
22 George LaPiana . . . . . Cambridge
32 Waldo Gifford Leland . . . . . Washington, D. C.
20 Charles Howard McIlwain . . . . . Belmont

14 Roger Bigelow Merriman . . . . . Cambridge
15 Samuel Eliot Morison . . . . . Boston
34 Robert Henry Pfeiffer . . . . . Cambridge
14 George Andrew Reisner . . . . . Boston
34 David Moore Robinson . . . . . Baltimore, Md.
23 Michael Ivanovich Rostovtzeff . . . . New Haven, Conn.
33 Edward Sapir . . . . . New Haven, Conn.
27 George Sarton . . . . . Cambridge
36 Donald Scott . . . . . Cambridge
34 Theodore Leslie Shear . . . . . Princeton, N. J.
26 Herbert Joseph Spinden . . . . . Brooklyn, N. Y.
16 John Osborne Sumner . . . . . Boston
32 Charles Holt Taylor . . . . . Cambridge
11 Charles Cutler Torrey . . . . . New Haven, Conn.
11 Alfred Marston Tozzer . . . . . Cambridge
20 Clark Wissler . . . . . New York, N. Y.
34 Lawrence Counselman Wroth . . . . . Providence, R. I.

CLASS IV, SECTION III—*Philology*—59

31 Edward Cooke Armstrong . . . . . Princeton, N. J.
33 William Nickerson Bates . . . . . Philadelphia, Pa.
35 Charles Henry Beeson . . . . . Chicago, Ill.
33 Campbell Bonner . . . . . Ann Arbor, Mich.
35 Robert Johnson Bonner . . . . . Chicago, Ill.
33 Carleton Brown . . . . . New York, N. Y.
21 Carl Darling Buck . . . . . Chicago, Ill.
18 Edward Capps . . . . . Princeton, N. J.
20 Walter Eugene Clark . . . . . Cambridge
32 Ronald Salmon Crane . . . . . Chicago, Ill.
32 Morris William Croll . . . . . Princeton, N. J.
31 Samuel Hazzard Cross . . . . . Cambridge
20 Franklin Edgerton . . . . . New Haven, Conn.
21 Frank Edgar Farley . . . . . Middletown, Conn.
14 Jeremiah Denis Mathias Ford . . . . . Cambridge
35 Tenney Frank . . . . . Baltimore, Md.
30 James Geddes, Jr. . . . . Brookline
13 Charles Hall Grandgent . . . . . Cambridge
16 Louis Herbert Gray . . . . . New York, N. Y.

25 William Chase Greene . . . . . Cambridge
13 Charles Burton Gulick . . . . . Cambridge
19 Roy Kenneth Hack . . . . . Cincinnati, Ohio
34 Austin Morris Harmon . . . . . New Haven, Conn.
31 Raymond Dexter Havens . . . . . Baltimore, Md.
18 George Lincoln Hendrickson . . . . . New Haven, Conn.
17 William Guild Howard . . . . . Cambridge
21 Eugene Xavier Louis Henry Hyvernat . . . Washington, D. C.
15 Carl Newell Jackson . . . . . Cambridge
13 James Richard Jewett . . . . . Cambridge
32 (Ralph) Hayward Keniston . . . . . Chicago, Ill.
34 Roland Grubb Kent . . . . . Philadelphia, Pa.
98 George Lyman Kittredge . . . . . Cambridge
33 Hans Kurath . . . . . Providence, R. I.
32 Ernest Felix Langley . . . . . Cambridge
[81] 98 Charles Rockwell Lanman . . . . . Cambridge
33 Ivan Mortimer Linforth . . . . . Berkeley, Cal.
31 Francis Peabody Magoun, Jr. . . . . Cambridge
11 Albert Matthews . . . . . Boston
35 Benjamin Dean Meritt . . . . . Princeton, N. J.
28 William Albert Nitze . . . . . Chicago, Ill.
32 George Rapall Noyes . . . . . Berkeley, Cal.
34 William Abbott Oldfather . . . . . Urbana, Ill.
33 Howard Rollin Patch . . . . . Northampton
32 Arthur Stanley Pease . . . . . Cambridge
35 Henry Washington Prescott . . . . . Chicago, Ill.
13 Edward Kennard Rand . . . . . Cambridge
11 Fred Norris Robinson . . . . . Cambridge
31 Robert Kilburn Root . . . . . Princeton, N. J.
35 Henry Arthur Sanders . . . . . Ann Arbor, Mich.
18 Rudolph Schevill . . . . . Berkeley, Cal.
32 Horatio Elwin Smith . . . . . New York, N. Y.
04 Herbert Weir Smyth . . . . . Cambridge
89 Franklin Bache Stephenson . . . . . Washington, D. C.
32 William Thomson . . . . . Cambridge
33 George Benson Weston . . . . . Cambridge
28 Joshua Whatmough . . . . . Arlington
30 Ernest Hatch Wilkins . . . . . Oberlin, Ohio

33 Harry Austryn Wolfson . . . . . Cambridge
33 Karl Young . . . . . New Haven, Conn.

CLASS IV, SECTION IV—*The Fine Arts and Belles Lettres*—53

31 Stephen Vincent Benét . . . . . New York, N. Y.
26 Frank Weston Benson . . . . . Salem
32 (William) Welles Bosworth . . . . . New York, N. Y.
33 John Alden Carpenter . . . . . Chicago, Ill.
32 Chalmers Dancy Clifton . . . . . New York, N. Y.
33 Charles Collens . . . . . Newton Center
32 Kenneth John Conant . . . . . Cambridge
34 Charles Jay Connick . . . . . Newtonville
21 Frederick Shepherd Converse . . . . . Westwood
29 Charles Townsend Copeland . . . . . Cambridge
[17] 30 Ralph Adams Cram . . . . . Boston
33 Cyrus Edwin Dallin . . . . . Arlington Heights
34 Samuel Foster Damon . . . . . Providence, R. I.
32 George Harold Edgell . . . . . Cambridge
21 William Emerson . . . . . Cambridge
33 Carl Engel . . . . . New York, N. Y.
30 John Erskine . . . . . New York, N. Y.
10 Arthur Fairbanks . . . . . Hanover, N. H.
18 Edward Waldo Forbes . . . . . Cambridge
31 Robert Frost . . . . . South Shaftsbury, Vt.
27 Wallace Goodrich . . . . . Boston
14 Robert Grant . . . . . Boston
17 Chester Noyes Greenough . . . . . Cambridge
36 William Clifford Heilman . . . . . Cambridge
29 Edward Burlingame Hill . . . . . Boston
31 Robert Silliman Hillyer . . . . . Cambridge
27 Charles Hopkinson . . . . . Manchester
12 Mark Antony DeWolfe Howe . . . . . Boston
18 Archer Milton Huntington . . . . . New York, N. Y.
31 Henry James . . . . . New York, N. Y.
(25) 32 William James . . . . . Cambridge
33 Leo Rich Lewis . . . . . Tufts College
20 John Ellerton Lodge . . . . . Washington, D. C.
21 John Livingston Lowes . . . . . Cambridge

21 Charles Donagh Maginnis . . . . . Brookline
31 Paul Manship . . . . . New York, N. Y.
31 Daniel Gregory Mason . . . . . New York, N. Y.
31 Frank Jewett Mather . . . . . Washington Crossing, Pa.
31 Kenneth Ballard Murdock . . . . . Cambridge
14 William Allan Neilson . . . . . Northampton
28 Curtis Hidden Page . . . . . Gilmanton, N. H.
21 William Lyon Phelps . . . . . New Haven, Conn.
(24) 32 Anthony John Philpott . . . . . Arlington
21 Chandler Rathfon Post . . . . . Cambridge
22 Paul Joseph Sachs . . . . . Cambridge
14 Ellery Sedgwick . . . . . Boston
19 Henry Dwight Sedgwick . . . . . Dedham
32 Henry Richardson Shepley . . . . . Brookline
33 David Stanley Smith . . . . . Woodbridge, Conn.
35 Walter Raymond Spalding . . . . . Cambridge
27 Edmund C. Tarbell . . . . . New Castle, N. H.
14 Owen Wister . . . . . Philadelphia, Pa.
22 Charles Henry Conrad Wright . . . . . Cambridge

FOREIGN HONORARY MEMBERS—127

(Number limited to one hundred and thirty)

CLASS I—*Mathematical and Physical Sciences*—35

SECTION I—*Mathematics and Astronomy*—9

22	Arthur Stanley Eddington	Cambridge, England
34	Ronald Aylmer Fisher	Harpenden, Herts
20	Jacques Salomon Hadamard	Paris
21	Godfrey Harold Hardy	Cambridge, England
27	Ejnar Hertzsprung	Leyden
17	Tullio Levi-Civita	Rome
03	Charles Emile Picard	Paris
15	Charles Jean de la Vallée Poussin	Louvain
29	Hermann Weyl	Princeton, N. J.

CLASS I, SECTION II—*Physics*—9

29	Vilhelm Frimann Koren Bjerknes	Oslo
24	Albert Einstein	Princeton, N. J.
29	James Franck	Baltimore, Md.
29	Abram F. Joffé	Leningrad
03	Sir Joseph Larmor	Cambridge, England
28	Friedrich Paschen	Charlottenburg
14	Max Planck	Berlin
15	Ernest Rutherford, Baron Rutherford	Cambridge, England
02	Sir Joseph John Thomson	Cambridge, England

CLASS I, SECTION III—*Chemistry*—8

29	Johannes N. Brönsted	Copenhagen
27	Peter Debye	Berlin
33	Jaroslav Heyrovsky	Prague
19	Henri Louis Le Chatelier	Paris
33	Fritz Paneth	London
28	Sören Peter Lauritz Sörensen	Copenhagen
29	Heinrich Wieland	Munich
34	Richard Willstätter	Munich

CLASS I, SECTION IV—*Technology and Engineering*—9

36 Edward Victor Appleton . . . . . London
34 Paul Janet . . . . . Paris
34 Luigi Lombardi . . . . . Rome
25 Maurice d'Ocagne . . . . . Paris
29 Ludwig Prandtl . . . . . Göttingen
29 Emil Probst . . . . . Karlsruhe
29 Aurel Stodola . . . . . Zürich
15 Vsevolod Evgenievich Timonoff . . . . . Leningrad
31 Karl Willy Wagner . . . . . Berlin

CLASS II—*Natural and Physiological Sciences*—34

SECTION I—*Geology, Mineralogy, and Physics of the Globe*—10

17 Frank Dawson Adams . . . . . Montreal
[15] 19 Charles Barrois . . . . . Lille
36 Raoul Blanchard . . . . . Grenoble, France
14 Waldemar Christofer Brögger . . . . . Oslo
29 Léon William Collet . . . . . Geneva
98 Albert Heim . . . . . Zürich
34 Arthur Holmes . . . . . Durham
22 Emmanuel de Margerie . . . . . Paris
21 Gustaf Adolf Frederik Molengraaff . . . . . Delft
18 Sir William Napier Shaw . . . . . London

CLASS II, SECTION II—*Botany*—7

32 Frederick Orpen Bower . . . . . Ripon
31 Ludwig Diels . . . . . Berlin
32 Kingo Miyabe . . . . . Sapporo, Japan
28 Alfred Barton Rendle . . . Leatherhead, Surrey, England
29 Otto Renner . . . . . Jena
32 Albert Charles Seward . . . . . Cambridge, England
35 Sir William Wright Smith . . . . . Edinburgh

CLASS II, SECTION III—*Zoology and Physiology*—9

23 George Albert Boulenger . . . . . Brussels
20 Maurice Caullery . . . . . Paris
34 Archibald Vivian Hill . . . . . London

31 August Krogh . . . . . Copenhagen
30 Louis Édouard Lapicque . . . . . Paris
19 George Henry Falkiner Nuttall . . . Cambridge, England
28 Charles Tate Regan . . . . . London
33 Hans Spemann . . . . . Freiburg i. Br.
28 D'Arcy Wentworth Thompson . . . . . St. Andrews

CLASS II, SECTION IV—*Medicine and Surgery*—8

18 Sir Thomas Barlow, Bart . . . . . London
27 Sir Henry Hallett Dale . . . . . London
33 Sir Arthur Keith . . . . . London
28 Mikinosuke Miyajima . . . . . Tokyo
27 Friedrich von Müller . . . . . Munich
18 Sir Charles Scott Sherrington . . . . . Ipswich, England
29 Sir Arnold Theiler . . . . . London
36 (Jean) Hyacinthe Vincent . . . . . Paris

CLASS III—*The Social Arts*—24

SECTION I—*Jurisprudence*—9

33 Frantz Dahl . . . . . Copenhagen
27 Léon Duguit . . . . . Bordeaux
33 François Geny . . . . . Nancy
33 Hans Kelsen . . . . . Vienna
33 Juljusz Makarewicz . . . . . Lwów
95 Rt. Hon. Sir Frederick Pollock, Bart . . . . . London
27 Joseph Redlich . . . . . Vienna
33 Rudolph Stammler . . . . . Wernigerode a. H.
33 Giorgio Del Vecchio . . . . . Rome

SECTION II—*Government, International Law, and Diplomacy*—2

32 Paul Claudel . . . . . Paris
32 Hu Shih . . . . . Peiping

SECTION III—*Economics and Sociology*—11

32 Arthur Lyon Bowley . . . . . Haslemere, Surrey
34 Gustav Cassel . . . . . Djursholm, Sweden

35 Luigi Einaudi . . . . . Turin
32 Ralph George Hawtrey . . . . . London
35 John Maynard Keynes . . . . . Cambridge, England
35 René Maunier . . . . . Paris
28 Arthur Cecil Pigou . . . . . Cambridge, England
32 Charles Rist . . . . . Fraisses (Loire)
33 Werner Sombart . . . . . Berlin
35 S. Rudolph Steinmetz . . . . . Amsterdam
34 Peter B. Struve . . . . . Belgrade

SECTION IV—*Administration and Affairs*—2

33 Gösta A. Bagge . . . . . Stockholm
33 Sir Josiah Stamp . . . . . Shortlands, Kent

CLASS IV—*The Humanities*—34

SECTION I—*Theology, Philosophy, and Psychology*—7

36 Miguel Asín y Palacios . . . . . Madrid
28 Henri Louis Bergson . . . . . Paris
28 Benedetto Croce . . . . . Naples
29 Étienne Gilson . . . . . Melun
28 Edmund Husserl . . . . . Freiburg i. B.
32 Pierre Janet . . . . . Paris
28 Wolfgang Köhler . . . . . Berlin

SECTION II—*History, Archæology, and Anthropology*—11

33 Rafael Altamira y Crevea . . . . . Madrid
36 Marcel Aubert . . . . . Paris
29 Godfrey Rathbone Benson, Baron Charnwood . . . London
97 Wilhelm Dörpfeld . . . . . Berlin-Lichterfelde
31 Rt. Hon. Herbert Albert Laurens Fisher . . . . . Oxford
33 Friedrich Meinecke . . . . . Berlin-Dahlem
28 Karl Pearson . . . . . London
22 Henri Pirenne . . . . . Uccle-Brussels
30 Sir Aurel Stein . . . . . Srinagar, Kashmir
31 Charles Sanford Terry . . . . . Aberdeen
31 George Macaulay Trevelyan . . . . Cambridge, England

SECTION III—*Philology*—8

29 Joseph Bédier . . . . . Paris
09 Hermann Georg Jacobi . . . . . Bonn
36 Paul Kretschmer . . . . . Vienna
32 Paul Mazon . . . . . Paris
31 Antoine Meillet . . . . . Paris
[12] 28 Hanns Oertel . . . . . Munich
17 Ramón Menéndez Pidal . . . . . Madrid
32 Frederick William Thomas . . . . . Oxford

SECTION IV—*The Fine Arts and Belles Lettres*—8

30 Alfredo Casella . . . . . Rome
23 Henry Guy . . . . . Grenoble
29 Paul Hazard . . . . . Paris
34 Serge Koussevitzky . . . . . Paris and Boston
27 Victor Laloux . . . . . Paris
27 Gilbert Murray . . . . . Oxford
31 Edgar Allison Peers . . . . . Liverpool
27 Henri Rabaud . . . . . Paris

ALPHABETICAL INDEX TO LISTS OF MEMBERS.

The letters F and FHM refer to the lists of Fellows and Foreign Honorary Members, respectively. The class and section are indicated by the numerals following.

Abbot, C. G. F, I: 1
Abrams, L. R. F, II: 2
Adams, C. A. F, I: 4
Adams, C. F. F, III: 4
Adams, C. R. F, I: 1
Adams, F. D. FHM, II: 1
Adams, R. F, I: 3
Adams, W. S. F, I: 1
Agassiz, G. R. F, I: 1
Ahern, M. J. F, IV: 1
Altamira y Crevea, R. FHM, IV: 2
Allport, G. W. F, IV: 1
Ames, A., Jr. F, I: 2
Ames, J. S. F, I: 2
Ames, O. F, II: 2
Anderson, E. F, II: 2
Anderson, G. W. F, III: 1
Andrews, C. M. F, IV: 2
Angell, J. R. F, IV: 1
Angell, J. W. F, III: 3
Appleton, E. V. FHM, I: 4
Archibald, R. C. F, I: 1
Armstrong, E. C. F, IV: 3
Arthur, J. C. F, II: 2
Asín y Palacios, M. FHM, IV: 1
Atwood, W. W. F, II: 1
Aub, J. C. F, II: 4
Aubert, M. FHM, IV: 2
Avery, O. T. F, II: 4
Ayer, J. B. F, II: 4
Bagge, G. A. FHM, III: 4
Bailey, I. W. F, II: 2
Bailey, L. H. F, II: 2
Balch, F. G. F, II: 4
Balch, F. N. F, III: 1
Bancroft, W. D. F, I: 3
Banks, N. F, II: 3
Barbour, T. F, II: 3
Bard, P. F, II: 3
Barlow, Sir T. FHM, II: 4
Barnett, S. J. F, I: 2
Barrois, C. FHM, II: 1
Barrows, H. K. F, I: 4
Batchelder, C. F. F, III: 4
Bates, W. N. F, IV: 3
Baxter, G. P. F, I: 3
Baxter, J. P., 3d. F, IV: 2
Beale, J. H. F, III: 1
Beattie, J. A. F, I: 3
Becker, C. L. F, IV: 2
Bédier, J. FHM, IV: 3
Beebe-Center, J. G. F, IV: 1
Beeson, C. H. F, IV: 3
Bell, S. F, III: 1
Benedict, F. G. F, II: 3
Benét, S. V. F, IV: 4
Bennett, A. A. F, I: 1
Benson, F. W. F, IV: 4
Bergson, H. L. FHM, IV: 1
Berry, C. H. F, I: 4
Berry, E. W. F, II: 2
Bevis, H. L. F, III: 2
Bigelow, H. A. F, III: 1
Bigelow, H. B. F, II: 3
Bigelow, R. P. F, II: 3
Biklé, H. W. F, III: 1
Birkhoff, G. D. F, I: 1
Bjerknes, V. F. K. FHM, I: 2
Blake, C. H. F, II: 3
Blake, R. P. F, IV: 2
Blakeslee, G. H. F, III: 2
Blanchard, A. A. F, I: 3
Blanchard, R. FHM, II: 1
Bliss, G. A. F, I: 1
Blumer, G. F, II: 4
Boas, F. F, IV: 2

Bogert, M. T. F, I: 3
Bolster, W. F, III: 1
Bonbright, J. C. F, III: 3
Bonner, C. F, IV: 3
Bonner, R. J. F, IV: 3
Booth, H. S. F, I: 3
Borchard, E. M. F, III: 2
Boring, E. G. F, IV: 1
Bosworth, W. F, IV: 1
Boulenger, G. A. FHM, II: 3
Bovie, W. T. F, II: 3
Bowditch, I. F, III: 4
Bowen, N. L. F, II: 1
Bower, F. O. FHM, II: 2
Bowley, A. L. FHM, III: 3
Bowman, I. F, II: 1
Boyden, E. A. F, II: 3
Branch, C. R. F, III: 1
Bray, W. C. F, I: 3
Bremer, J. L. F, II: 3
Bridgman, P. W. F, I: 2
Brightman, E. S. F, IV: 1
Brögger, W. C. FHM, II: 1
Brönsted, J. N. FHM, I: 3
Brooks, C. F. F, II: 1
Brown, C. F, IV: 3
Brown, E. W. F, I: 1
Bruce, H. A. F, IV: 1
Brues, C. T. F, II: 3
Bryan, K. F, II: 1
Buck, C. D. F, IV: 3
Bunker, J. W. M. F, II: 3
Burbank, H. H. F, III: 3
Burwell, C. S. F, II: 4
Bush, V. F, I: 4
Cabot, P. F, III: 3
Cabot, W. B. F, IV: 2
Cady, W. G. F, I: 2
Campbell, C. G. F, IV: 2
Campbell, C. M. F, II: 4
Campbell, D. H. F, II: 2
Campbell, G. A. F, I: 2
Campbell, L. L. F, I: 2
Campbell, W. W. F, I: 1
Cannon, W. B. F, II: 3
Capps, E. F, IV: 3
Cardozo, B. N. F, III: 1
Carmichael, L. F, IV: 1
Carpenter, F. M. F, II: 1
Carpenter, J. A. F, IV: 4
Carpenter, T. M. F, II: 3
Carrel, A. F, II: 4
Casella, A. FHM, IV: 4
Casey, R. P. F, IV: 1
Cassel, G. FHM, III: 3
Castle, W. B. F, II: 4
Castle, W. E. F, II: 3
Castle, W. R., Jr. F, III: 2
Cattell, J. M. F, IV: 1
Caullery, M. FHM, II: 3
Cell, G. C. F, IV: 1
Chaffee, E. L. F, I: 2
Chamberlain, J. P. F, III: 2
Chamberlin, E. H. F, III: 3
Chapin, C. V. F, II: 4
Charnwood, Lord. FHM, IV: 2
Chase, G. H. F, IV: 2
Cheever, D. F, II: 4
Chittenden, R. H. F, I: 3
Christian, H. A. F, II: 4
Clark, J. B. F, III: 3
Clark, J. M. F, III: 3
Clark, W. E. F, IV: 3
Claudel, P. FHM, III: 2
Clayton, H. H. F, II: 1
Cleveland, L. R. F, II: 3
Clifford, H. E. F, I: 4
Clifton, C. D. F, IV: 4
Clinton, G. P. F, II: 2
Cohn, E. J. F, II: 3
Cole, A. H. F, III: 3
Cole, R. F, II: 4
Collens, C. F, IV: 4
Collet, L. W. FHM, II: 1
Compton, A. H. F, I: 2
Compton, K. T. F, I: 2
Comstock, D. F. F, I: 2
Conant, J. B. F, I: 3
Conant, K. J. F, IV: 4
Conklin, E. G. F, II: 3
Connick, C. J. F, IV: 4
Converse, F. S. F, IV: 4

Coolidge, J. L. F, I: 1
Coolidge, W. D. F, I: 2
Copeland, C. T. F, IV: 4
Copeland, M. F, II: 3
Copeland, M. T. F, III: 3
Cousens, J. A. F, III: 4
Cram, R. A. F, IV: 4
Crane, R. S. F, IV: 3
Crane, R. T. F, III: 2
Crawford, F. H. F, I: 2
Crew, H. F, I: 2
Croce, B. FHM, IV: 1
Croll, M. W. F, IV: 3
Cross, S. H. F, IV: 3
Crozier, W. J. F, II: 3
Crum, W. L. F, III: 3
Cunningham, W. J. F, III: 3
Cushing, H. F, II: 4
Cushman, J. A. F, II: 3
Cutler, E. C. F, II: 4
Dahl, F. FHM, III: 1
Dahl, O. G. C. F, I: 4
Dale, Sir H. H. FHM, II: 4
Dallin, C. E. F, IV: 4
Daly, R. A. F, II: 1
Damon, S. F. F, IV: 4
Daniel, J. F. F, II: 3
Daniels, W. M. F, III: 3
Davenport, C. B. F, II: 3
Davis, B. M. F, II: 2
Davis, C. T. F, III: 1
Davis, H. F, II: 3
Davis, H. N. F, I: 2
Davis, T. L. F, I: 3
Davisson, C. J. F, I: 2
Dawes, C. L. F, I: 4
Dawson, A. B. F, II: 3
Day, A. L. F, I: 2
Day, C. F, III: 3
Dearborn, W. F. F, IV: 1
Debye, P. FHM, I: 3
Delabarre, E. B. F, IV: 1
Den Hartog, J. P. F, I: 4
Dennett, T. F, III: 2
Dennison, H. S. F, III: 4
Detwiler, S. R. F, II: 3
Dewey, D. R. F, III: 3
Dewing, A. S. F, III: 3
Dickinson, J. F, III: 1
Dickson, L. E. F, I: 1
Diels, L. FHM, II: 2
Dillon, T. H. F, I: 4
Dodge, B. O. F, II: 2
Dodge, R. F, IV: 1
Dörpfeld, W. FHM, IV: 2
Donham, W. B. F, III: 3
Douglas, J. F, I: 1
Drinker, P. F, I: 4
Drisko, W. J. F, I: 2
Du Bois, E. F. F, II: 4
Ducasse, C. J. F, IV: 1
Duff, A. W. F, I: 2
Duguit, L. FHM, III: 1
Dunn, G. F, I: 4
Durand, W. F. F, I: 4
Eames, W. F, IV: 2
East, E. M. F, II: 2
Ebersole, J. F. F, III: 3
Eddington, A. S. FHM, I: 1
Edgell, G. H. F, IV: 4
Edgerton, F. F, IV: 3
Einaudi, L. FHM, III: 3
Einstein, A. FHM, I: 2
Emerson, R. A. F, II: 2
Emerson, W. F, IV: 4
Engel, C. F, IV: 4
Erskine, J. F, IV: 4
Evans, A. W. F, II: 2
Evans, G. C. F, I: 1
Evans, H. M. F, II: 3
Ewell, A. W. F, I: 2
Fair, G. M. F, I: 4
Fairbanks, A. F, IV: 4
Fairchild, F. R. F, III: 3
Fall, H. C. F, II: 3
Farley, F. E. F, IV: 3
Farrand, M. F, IV: 2
Fassig, O. L. F, II: 1
Faull, J. H. F, II: 2
Fay, F. H. F, I: 4
Fay, H. F, I: 3
Fay, S. B. F, III: 2

Ferguson, W. S. F, IV: 2
Fergusson, S. P. F, II: 1
Fernald, M. L. F, II: 2
Fetter, F. A. F, III: 3
Field, F. T. F, III: 1
Field, W. L. W. F, III: 4
Fieser, L. F. F, I: 3
Fisher, H. A. L. FHM, IV: 2
Fisher, I. F, III: 3
Fisher, R. A. FHM, I: 1
Fiske, C. H. F, II: 3
Fitz, R. F, II: 4
Flexner, S. F, II: 4
Forbes, A. F, II: 3
Forbes, E. W. F, IV: 4
Forbes, G. S. F, I: 3
Forbes, W. C. F, III: 2
Ford, J. F, III: 3
Ford, J. D. M. F, IV: 3
Ford, W. C. F, IV: 2
Ford, W. E. F, II: 1
Fowler, H. T. F, IV: 2
Fox, P. F, I: 1
Franck, J. FHM, I: 2
Frank, T. F, IV: 3
Frankfurter, F. F, III: 1
Franklin, E. C. F, I: 3
Franklin, F. F, I: 1
Franklin, P. F, I: 1
Freeman, R. E. F, III: 3
Frost, R. F, IV: 4
Fulton, J. F. F, II: 3
Furniss, E. S. F, III: 2
Gage, T. H. F, III: 1
Gamble, J. L. F, II: 4
Gay, E. F. F, III: 3
Geddes, J., Jr. F, IV: 3
Geny, F. FHM, III: 1
Gilboy, G. F, I: 4
Gillespie, L. J. F, I: 3
Gilson, E. FHM, IV: 1
Glueck, S. F, III: 3
Goldthwait, J. W. F, II: 1
Goodale, J. L. F, II: 4
Goodnow, F. J. F, III: 4
Goodrich, W. F, IV: 4
Goodwin, H. M. F, I: 2
Grandgent, C. H. F, IV: 3
Grant, R. F, IV: 4
Graton, L. C. F, II: 1
Graustein, W. C. F, I: 1
Gray, L. H. F, IV: 3
Green, T. F. F, III: 1
Greene, E. B. F, IV: 2
Greene, J. D. F, III: 4
Greene, W. C. F, IV: 3
Greenough, C. N. F, IV: 4
Greenough, R. B. F, II: 4
Gregory, H. E. F, II: 1
Gregory, W. K. F, II: 3
Grew, J. C. F, III: 2
Grinnell, J. F, II: 3
Gulick, C. B. F, IV: 3
Guy, H. FHM, IV: 4
Hack, R. K. F, IV: 3
Hadamard, J. S. FHM, I: 1
Haertlein, A. F, I: 4
Haig, R. M. F, III: 3
Haines, C. G. F, III: 2
Hale, G. E. F, I: 2
Hall, E. H. F, I: 2
Hall, W. P. F, III: 1
Hand, L. F, III: 1
Hardy, A. C. F, I: 2
Hardy, G. H. FHM, I: 1
Harmon, A. M. F, IV: 3
Harper, R. A. F, II: 2
Harris, L. F, I: 3
Harrison, G. R. F, I: 2
Harrison, R. G. F, II: 4
Hart, A. B. F, III: 2
Hart, F. R. F, III: 4
Haskins, C. H. F, IV: 2
Hastings, A. B. F, I: 3
Hatch, W. H. P. F, IV: 1
Havens, R. D. F, IV: 3
Hawtrey, R. G. FHM, III: 3
Hayes, H. V. F, I: 2
Hazard, P. FHM, IV: 4
Hazen, C. D. F, IV: 2
Healy, W. F, IV: 1
Heidel, W. A. F, IV: 1

Heilman, W. C. F, IV: 4
Heim, A. FHM, II: 1
Henderson, L. J. F, I: 3
Hendrickson, G. L. F, IV: 3
Henshaw, S. F, II: 3
Hertzsprung, E. FHM, I: 1
Heyrovsky, J. FHM, I: 3
Hill, A. V. FHM, II: 3
Hill, B. H. F, IV: 2
Hill, E. B. F, IV: 4
Hille, E. F, I: 1
Hillyer, R. S. F, IV: 4
Hisaw, F. L. F, II: 3
Hitchcock, F. L. F, I: 1
Hoadley, L. F, II: 3
Hoagland, H. F, II: 3
Hocking, W. E. F, IV: 1
Holcombe, A. N. F, III: 2
Holmes, A. FHM, II: 1
Holmes, E. J. F, III: 4
Holmes, H. W. F, III: 3
Holmes, S. J. F, II: 3
Hooton, E. A. F, IV: 2
Hopkinson, C. F, IV: 4
Horwood, M. P. F, I: 4
Hoskins, H. L. F, IV: 2
Hoskins, R. G. F, II: 3
Hovgaard, W. F, I: 4
Howard, L. O. F, II: 3
Howard, W. G. F, IV: 3
Howe, M. A. DeW. F, IV: 4
Howe, P. R. F, II: 4
Howell, W. H. F, II: 4
Hrdlička, A. F, IV: 2
Hu Shih. FHM, III: 2
Hubbard, J. C. F, I: 2
Hudson, M. O. F, III: 2
Hughes, C. E. F, III: 1
Hull, C. L. F, IV: 1
Hull, G. F. F, I: 2
Hume, E. E. F, II: 4
Humphreys, W. J. F, II: 1
Hunsaker, J. C. F, I: 4
Hunt, R. F, II: 4
Hunter, W. S. F, IV: 1
Huntington, A. M. F, IV: 4
Huntington, E. F, II: 1
Huntington, E. V. F, I: 1
Huntress, E. H. F, I: 3
Husserl, E. FHM, IV: 1
Hutchins, C. C. F, I: 2
Hyvernat, E. X. L. H. F, IV: 3
Isaacs, N. F, III: 1
Ives, F. E. F, I: 2
Ives, J. E. F, I: 2
Jack, J. G. F, II: 2
Jack, J. R. F, I: 4
Jackson, C. N. F, IV: 3
Jackson, D. F, I: 1
Jackson, D. C. F, I: 4
Jackson, F. J. F. F, IV: 1
Jackson, H., Jr. F, II: 4
Jackson, R. T. F, II: 1
Jacobi, H. G. FHM, IV: 3
Jaggar, T. A. F, II: 1
James, E. R. F, III: 1
James, H. F, IV: 4
James, W. F, IV: 4
Janet, Paul. FHM, I: 4
Janet, Pierre. FHM, IV: 1
Jennings, H. S. F, II: 3
Jennings, W. L. F, I: 3
Jepson, W. L. F, II: 2
Jessup, P. C. F, III: 2
Jewett, F. B. F, I: 4
Jewett, J. R. F, IV: 3
Joffé, A. F. FHM, I: 2
Johnson, D. W. F, II: 1
Johnson, L. J. F, I: 4
Johnston, I. M. F, II: 2
Jones, D. F. F, II: 2
Jones, G. F, I: 3
Jones, M. B. F, III: 4
Joslin, E. P. F, II: 4
Keith, Sir A. FHM, II: 4
Keith, A. F, II: 1
Kelley, T. L. F, IV: 1
Kelsen, H. FHM, III: 1
Kemble, E. C. F, I: 2
Kemmerer, E. W. F, III: 3
Kendall, H. P. F, III: 4
Keniston, H. F, IV: 3

Kennelly, A. E. F, I: 4
Kent, N. A. F, I: 2
Kent, R. G. F, IV: 3
Keyes, F. G. F, I: 3
Keynes, J. M. FHM, III: 3
Kidder, A. V. F, IV: 2
Kidder, N. T. F, III: 4
Kistiakowsky, G. B. F, I: 3
Kittredge, G. L. F, IV: 3
Knight, F. H. F, III: 3
Knudson, A. C. F, IV: 1
Köhler, W. FHM, IV: 1
Koffka, K. F, IV: 1
Kofoid, C. A. F, II: 3
Kohler, E. P. F, I: 3
Koussevitzky, S. FHM, IV: 4
Kraus, C. A. F, I: 3
Kretschmer, P. FHM, IV: 3
Kroeber, A. L. F, IV: 2
Krogh, A. FHM, II: 3
Kurath, H. F, IV: 3
Lake, K. F, IV: 2
Laloux, V. FHM, IV: 4
Lamb, A. B. F, I: 3
Lambie, M. B. F, III: 2
Lamont, T. W. F, III: 4
Lampland, C. O. F, I: 1
Lane, A. C. F, II: 1
Langley, E. F. F, IV: 3
Langmuir, I. F, I: 3
Lanman, C. R. F, IV: 3
La Piana, G. F, IV: 2
Lapicque, L. E. FHM, II: 3
Larmor, Sir J. FHM, I: 2
Larsen, E. S. F, II: 1
Lashley, K. S. F, IV: 1
Lawrence, R. R. F, I: 4
Lawrence, W. F, IV: 1
Lawrence, W. H. F, I: 4
Laws, F. A. F, I: 2
Lawson, A. C. F, II: 1
Lawton, F. F, III: 1
Le Chatelier, H. L. FHM, I: 3
Lee, R. I. F, II: 4
Lefavour, H. F, I: 2
Leith, C. K. F, II: 1
Leland, W. G. F, IV: 2
Levi-Civita, T. FHM, I: 1
Lewis, C. I. F, IV: 1
Lewis, F. T. F, II: 3
Lewis, G. N. F, I: 3
Lewis, L. R. F, IV: 4
Lewis, W. K. F, I: 3
Lillie, F. R. F, II: 3
Lillie, R. S. F, II: 3
Lindgren, W. F, II: 1
Lindsay, R. B. F, I: 2
Linforth, I. M. F, IV: 3
Lipman, J. G. F, II: 2
Little, C. C. F, III: 4
Livingston, B. E. F, II: 2
Locke, E. A. F, II: 4
Lodge, J. E. F, IV: 4
Lombardi, L. FHM, I: 4
Longcope, W. T. F, II: 4
Loomis, F. B. F, II: 1
Lowell, A. L. F, III: 2
Lowes, J. L. F, IV: 4
Lull, R. S. F, II: 3
Lund, F. B. F, II: 4
Luyten, W. J. F, I: 1
Lyman, T. F, I: 2
McAdie, A. G. F, II: 1
McCollester, L. S. F, IV: 1
McCrea, R. C. F, III: 3
MacDonald, W. F, III: 2
McDougall, W. F, IV: 1
McEwen, G. F. F, II: 1
McIlwain, C. H. F, IV: 2
MacInnes, D. A. F, I: 3
MacIver, R. M. F, III: 3
McKeehan, L. W. F, I: 2
McLaren, W. W. F, III: 3
McLaughlin, D. H. F, II: 1
McNair, M. P. F, III: 3
Macneil, S. F, III: 1
Maginnis, C. D. F, IV: 4
Magoun, F. P., Jr. F, IV: 3
Magrath, G. B. F, II: 4
Magruder, C. F, III: 1
Main, C. T. F, I: 4
Makarewicz, J. FHM, III: 1

Mallory, F. B. F, II: 4
Malone, D. F, III: 4
Manship, P. F, IV: 4
Margerie, E. de. FHM, II: 1
Mark, E. L. F, II: 3
Mark, K. L. F, I: 3
Marks, L. S. F, I: 4
Marshall, L. C. F, III: 3
Mason, D. G. F, IV: 4
Mason, E. S. F, III: 3
Mather, F. J. F, IV: 4
Mather, K. F. F, II: 1
Mathews, E. B. F, II: 1
Matthews, A. F, IV: 3
Maunier, R. FHM, III: 3
May, J. V. F, III: 4
Mayo, E. F, III: 3
Mayo, W. J. F, II: 4
Mazon, P. FHM, IV: 3
Mead, A. D. F, II: 3
Mead, W. J. F, II: 1
Meillet, A. FHM, IV: 3
Meinecke, F. FHM, IV: 2
Melander, A. L. F, II: 3
Menzel, D. H. F, I: 1
Meriam, R. S. F, III: 3
Meritt, B. D. F, IV: 3
Merriam, C. E. F, III: 2
Merriam, J. C. F, II: 1
Merrill, E. D. F, II: 2
Merriman, R. B. F, IV: 2
Merritt, E. G. F, I: 2
Meyer, K. F. F, II: 3
Milas, N. A. F, I: 3
Miller, D. C. F, I: 2
Miller, G. A. F, I: 1
Miller, G. S. F, II: 3
Miller, J. A. F, I: 1
Miller, W. J. F, II: 1
Millikan, R. A. F, I: 2
Millis, H. A. F, III: 3
Mills, F. C. F, III: 3
Mills, O. L. F, III: 2
Mimno, H. R. F, I: 2
Miner, L. M. S. F, II: 4
Minot, G. R. F, II: 4
Mitchell, S. A. F, I: 1
Mitchell, W. C. F, III: 3
Mitchell, W. DeW. F, III: 1
Miyabe, K. FHM, II: 2
Miyajima, M. FHM, II: 4
Molengraaff, G. A. F. FHM, II: 1
Monroe, A. E. F, III: 3
Moore, E. C. F, IV: 1
Moore, J. B. F, III: 2
More, P. E. F, IV: 1
Moreland, E. L. F, I: 4
Morgan, E. M. F, III: 1
Morgan, T. H. F, II: 3
Morison, S. E. F, IV: 2
Morley, F. F, I: 1
Morris, F. K. F, II: 1
Morse, M. F, I: 1
Morse, P. M. F, I: 2
Morton, A. A. F, I: 3
Moss, W. L. F, II: 4
Moulton, F. R. F, I: 1
Moulton, H. G. F, III: 3
Mueller, E. F, I: 3
Müller, F. von. FHM, II: 4
Mueller, J. H. F, II: 4
Munro, W. B. F, III: 2
Munroe, C. E. F, I: 3
Murdock, K. B. F, IV: 4
Murray, G. FHM, IV: 4
Murray, H. A., Jr. F, IV: 1
Neal, H. V. F, II: 3
Neilson, W. A. F, IV: 4
Newhouse, W. H. F, II: 1
Nichols, E. L. F, I: 2
Nitze, W. A. F, IV: 3
Nock, A. D. F, IV: 1
Norris, J. F. F, I: 3
Norton, A. E. F, I: 4
Norton, C. L. F, I: 2
Nourse, E. G. F, III: 3
Noyes, G. R. F, IV: 3
Noyes, W. A. F, I: 3
Noyes, W. A., Jr. F, I: 3
Nuttall, G. H. F. FHM, II: 3
d'Ocagne, M. FHM, I: 4
O'Connell, W. H. F, IV: 1

O'Connor, J. F, IV: 1
Oertel, H. FHM, IV: 3
Ogburn, W. F. F, III: 3
Oldenberg, O. F, I: 2
Oldfather, W. A. F, IV: 3
Olmsted, F. L. F, I: 4
Osgood, R. B. F, II: 4
Osterhout, W. J. V. F, II: 2
Page, C. H. F, IV: 4
Page, L. F, I: 2
Palache, C. F, II: 1
Paneth, F. FHM, I: 3
Park, C. E. F, IV: 1
Park, C. F. F, I: 4
Park, R. E. F, III: 3
Parker, G. H. F, II: 3
Parker, H. F, III: 1
Parker, P. S. F, III: 1
Parkman, H., Jr. F, III: 1
Parks, L. F, IV: 1
Paschen, F. FHM, I: 2
Patch, H. R. F, IV: 3
Peabody, F. G. F, IV: 1
Pearl, R. F, II: 3
Pearse, L. F, I: 4
Pearson, K. FHM, IV: 2
Pease, A. S. F, IV: 3
Peers, E. A. FHM, IV: 4
Peirce, G. J. F, II: 2
Pender, H. F, I: 4
Pepper, G. W. F, III: 1
Perkins, T. N. F, III: 4
Persons, W. M. F, III: 3
Peters, A. J. F, III: 4
Pfeiffer, R. H. F, IV: 2
Phelps, W. L. F, IV: 4
Phillips, H. B. F, I: 1
Phillips, J. C. F, II: 3
Philpott, A. J. F, IV: 4
Picard, C. E. FHM, I: 1
Pickard, G. W. F, I: 4
Pickering, W. H. F, I: 1
Pidal, R. M. FHM, IV: 3
Pierce, G. W. F, I: 2
Pigou, A. C. FHM, III: 3
Pilsbry, H. A. F, II: 3
Pirenne, H. FHM, IV: 2
Planck, M. FHM, I: 2
Pollock, Sir F. FHM, III: 1
Poor, C. L. F, I: 1
Post, C. R. F, IV: 4
Pound, R. F, III: 1
Prandtl, L. FHM, I: 4
Pratt, C. C. F, IV: 1
Pratt, F. H. F, II: 3
Pratt, J. H. F, II: 4
Prescott, H. W. F, IV: 3
Prescott, S. C. F, I: 3
Probst, E. FHM, I: 4
Putnam, H. F, III: 4
Putnam, T. J. F, II: 4
Qua, S. E. F, III: 1
Quinby, W. C. F, II: 4
Rabaud, H. FHM, IV: 4
Rand, E. K. F, IV: 3
Rand, H. W. F, II: 3
Rapport, D. F, II: 3
Raymond, P. E. F, II: 1
Redfield, A. C. F, II: 3
Redlich, J. FHM, III: 1
Regan, C. T. FHM, II: 3
Rehder, A. F, II: 2
Reisner, G. A. F, IV: 2
Rendle, A. B. FHM, II: 2
Renner, O. FHM, II: 2
Richards, A. N. F, II: 3
Richards, R. H. F, I: 3
Richardson, R. G. D. F, I: 1
Richtmyer, F. K. F, I: 2
Riddle, O. F, II: 3
Ripley, A. L. F, III: 4
Rist, C. FHM, III: 3
Ritter, W. E. F, II: 3
Robinson, D. M. F, IV: 2
Robinson, F. N. F, IV: 3
Rogers, A. F. F, II: 1
Root, E. F, III: 1
Root, R. K. F, IV: 3
Rosanoff, M. A. F, I: 3
Rossby, C. G. A. F, II: 1
Rostovtzeff, M. I. F, IV: 2
Rowe, L. S. F, III: 3

Rugg, A. P. F, III: 1
Ruggles, A. H. F, II: 4
Russell, G. E. F, I: 4
Russell, H. N. F, I: 1
Rutherford, Baron. FHM, I: 2
Ruthven, A. G. F, II: 3
Rutledge, G. F, I: 1
Ryan, J. H. F, IV: 1
Sachs, P. J. F, IV: 4
Sanders, H. A. F, IV: 3
Sanders, T. H. F, III: 3
Sapir, E. F, IV: 2
Sarton, G. F, IV: 2
Saunders, F. A. F, I: 2
Sauveur, A. F, I: 4
Sax, K. F, II: 2
Sayles, R. W. F, II: 1
Sayre, F. B. F, III: 1
Scatchard, G. F, I: 3
Schaller, W. T. F, II: 1
Schell, E. H. F, III: 4
Schevill, R. F, IV: 3
Schlesinger, F. F, I: 1
Schuchert, C. F, II: 1
Schumb, W. C. F, I: 3
Schumpeter, J. A. F, III: 3
Scott, A. W. F, III: 1
Scott, D. F, IV: 2
Scott, J. B. F, III: 1
Scott, W. B. F, II: 1
Sedgwick, E. F, IV: 4
Sedgwick, H. D. F, IV: 4
Sellards, A. W. F, II: 4
Setchell, W. A. F, II: 2
Seward, A. C. FHM, II: 2
Shapley, H. F, I: 1
Shattuck, G. C. F, II: 4
Shattuck, H. L. F, III: 4
Shaw, Sir W. N. FHM, II: 1
Shear, T. L. F, IV: 2
Shepley, H. R. F, IV: 4
Sherrill, H. K. F, IV: 1
Sherrill, M. S. F, I: 3
Sherrington, Sir C. S. FHM, II: 4
Shimer, H. W. F, II: 1
Simpson, S. P. F, III: 1
Sinnott, E. W. F, II: 2
Slater, J. C. F, I: 2
Slipher, V. M. F, I: 1
Slocum, F. F, I: 1
Smith, D. S. F, IV: 4
Smith, G. M. F, II: 2
Smith, H. E. F, IV: 3
Smith, H. M. F, I: 3
Smith, L. B. F, I: 3
Smith, P. F, III: 4
Smith, Sir W. W. FHM, II: 2
Smyth, H. L. F, I: 4
Smyth, H. W. F, IV: 3
Snyder, C. F, III: 3
Snyder, V. F, I: 1
Sörensen, S. P. L. FHM, I: 3
Sollmann, T. H. F, II: 4
Sombart, W. FHM, III: 3
Sorokin, P. A. F, III: 3
Spalding, W. R. F, IV: 4
Spemann, H. FHM, II: 3
Sperry, W. L. F, IV: 1
Spinden, H. J. F, IV: 2
Spofford, C. M. F, I: 4
Sprague, O. M. W. F, III: 3
Stafford, R. H. F, IV: 1
Stakman, E. C. F, II: 2
Stammler, R. FHM, II: 1
Stamp, Sir J. FHM, III: 4
Stearns, A. W. F, III: 4
Stebbins, J. F, I: 1
Stein, Sir A. FHM, IV: 2
Steinmetz, S. R. FHM, III: 3
Stephenson, F. B. F, IV: 3
Stetson, H. T. F, I: 1
Stevens, J. F. F, I: 4
Stieglitz, J. O. F, I: 3
Stiles, C. W. F, II: 4
Stiles, P. G. F, II: 3
Stodola, A. FHM, I: 4
Stone, H. F. F, III: 1
Stone, J. S. F, I: 2
Stone, M. H. F, I: 1
Strong, R. P. F, II: 4
Struik, D. J. F, I: 1
Struve, P. B. FHM, III: 3

Sumner, J. O. F, IV: 2
Talbot, F. B. F, II: 4
Tamarkin, J. D. F, I: 1
Tarbell, E. C. F, IV: 4
Taussig, F. W. F, III: ?
Taylor, C. H. F, III: 4
Taylor, C. H. F, IV: 2
Taylor, F. B. F, II: 1
Teggart, F. J. F, III: 3
Terman, L. M. F, IV: 1
Terry, C. S. FHM, IV: 2
Theiler, Sir A. FHM, II: 4
Thomas, F. W. FHM, IV: 3
Thomas, W. I. F, III: 3
Thompson, D'A. W. FHM, II: 3
Thompson, M. deK. F, I: 2
Thomson, E. F, I: 2
Thomson, Sir J. J. FHM, I: 2
Thomson, W. F, IV: 3
Thorndike, E. L. F, IV: 1
Thurston, E. S. F, III: 1
Thwing, C. F. F, III: 4
Timonoff, V. E. FHM, I: 4
Tolman, R. C. F, I: 3
Torrey, C. C. F, IV: 2
Tozzer, A. M. F, IV: 2
Trelease, W. F, II: 2
Trevelyan, G. M. FHM, IV: 2
Tucker, D. S. F, III: 3
Turner, C. E. F, III: 4
Tyler, H. W. F, I: 1
Tyzzer, E. E. F, II: 4
Usher, A. P. F, III: 3
Vallarta, M. S. F, I: 2
Vallée Poussin, C. J. de la. FHM, I: 1
Van de Graaff, R. J. F, I: 2
Van Vleck, J. H. F, I: 2
Vaughan, T. W. F, II: 1
Veblen, O. F, I: 1
Vecchio, G. Del. FHM, III: 1
Verhoeff, F. H. F, II: 4
Vincent, J. H. FHM, II: 4
Viner, J. F, III: 3
Wagner, K. W. FHM, I: 4
Walsh, J. L. F, I: 1
Wambaugh, E. F, III: 1
Warner, E. P. F, I: 4
Warren, B. E. F, I: 2
Warren, C. H. F, II: 1
Washburn, H. B. F, IV: 1
Watson, J. B. F, IV: 1
Wearn, J. T. F, II: 4
Weatherby, C. A. F, II: 2
Webster, D. L. F, I: 2
Webster, E. S. F, III: 4
Weiss, S. F, II: 4
Wells, A. E. F, I: 4
Wells, F. L. F, IV: 1
Weston, G. B. F, IV: 3
Weston, R. S. F, I: 4
Weston, W. H. F, II: 2
Wetmore, R. H. F, II: 2
Weyl, H. FHM, I: 1
Weysse, A. W. F, II: 3
Whatmough, J. F, IV: 3
Wheeler, W. M. F, II: 3
White, B. F, II: 4
Whitehead, A. N. F, I: 1
Whitlock, H. P. F, II: 1
Whitman, E. A. F, III: 1
Whitney, W. R. F, I: 3
Whittlesey, D. S. F, II: 1
Widder, D. V. F, I: 1
Wieland, H. FHM, I: 3
Wilkins, E. H. F, IV: 3
Williams, J. H. F, III: 3
Williams, R. S. F, I: 3
Willis, B. F, II: 1
Willits, J. H. F, III: 3
Willoughby, W. F. F, III: 2
Willoughby, W. W. F, III: 2
Willstätter, R. FHM, I: 3
Wilson, E. B. F, II: 3
Wilson, E. B. F, I: 2
Wilson, G. G. F, III: 2
Winsor, F. E. F, I: 4
Wissler, C. F, IV: 2
Wister, O. F, IV: 4
Wolbach, S. B. F, II: 4
Wolff, J. E. F, II: 1
Wolfson, H. A. F, IV: 3
Wolman, L. F, III: 3

Wood, R. W. F, I: 2
Woodman, A. G. F, I: 3
Woods, F. A. F, II: 3
Woods, F. S. F, I: 1
Woodworth, R. S. F, IV: 1
Worcester, J. R. F, I: 4
Worrall, D. E. F, I: 3
Wright, C. H. C. F, IV: 4
Wright, F. E. F, II: 1
Wright, Q. F, III: 2
Wroth, L. C. F, IV: 2
Wyman, J., Jr. F, II: 3
Yeomans, H. A. F, III: 2
Yerkes, R. M. F, IV: 1
Young, B. L. F, III: 4
Young, K. F, IV: 3
Zeleny, J. F, I: 2
Zimmerman, C. C. F, III: 3
Zinsser, H. F, II: 4

STATUTES AND STANDING VOTES.

STATUTES.

Adopted November 8, 1911: *amended May* 8, 1912, *January* 8, *and May* 14, 1913, *April* 14, 1915, *April* 12, 1916, *April* 10, 1918, *May* 14, 1919, *February* 8, *April* 12, *and December* 13, 1922, *February* 14, *March* 14, *and October* 10, 1923, *March* 10, 1926, *May* 9, 1928, *April* 8 *and November* 11, 1931, *April* 12, 1933, *and February* 14, 1934.

CHAPTER I.

The Corporate Seal.

Article 1. The Corporate Seal of the Academy shall be as here depicted:

Article 2. The Recording Secretary shall have the custody of the Corporate Seal.

See Chap. v, art. 3; chap. vi, art. 2.

CHAPTER II.

Fellows and Foreign Honorary Members and Dues.

Article 1. The Academy consists of Fellows, who are either citizens or residents of the United States of America, and Foreign Honorary Members. They are arranged in four Classes, according to the Arts and Sciences in which they are severally proficient, and each Class is divided into four Sections, namely:

Class I. *The Mathematical and Physical Sciences*

Section 1. Mathematics and Astronomy
Section 2. Physics
Section 3. Chemistry
Section 4. Technology and Engineering

Class II. *The Natural and Physiological Sciences*

Section 1. Geology, Mineralogy, and Physics of the Globe
Section 2. Botany
Section 3. Zoölogy and Physiology
Section 4. Medicine and Surgery

Class III. *The Social Arts*

Section 1. Jurisprudence
Section 2. Government, International Law, and Diplomacy
Section 3. Economics and Sociology
Section 4. Administration and Affairs

Class IV. *The Humanities*

Section 1. Theology, Philosophy, and Psychology
Section 2. History, Archæology, and Anthropology
Section 3. Philology
Section 4. The Fine Arts and Belles Lettres

Article 2. The number of Fellows shall not exceed Eight hundred, of whom not more than Six hundred shall be residents of Massachusetts, nor shall there be more than Two hundred and twenty in any one Class.

Article 3. The number of Foreign Honorary Members shall not exceed One hundred and thirty. They shall be chosen from among citizens of foreign countries most eminent for their discoveries and

attainments in any of the Classes above enumerated. There shall not be more than Thirty-five in any one Class.

ARTICLE 4. If any person, after being notified of his election as Fellow, shall neglect for six months to accept in writing, or, if a Fellow resident within fifty miles of Boston shall neglect to pay his Admission Fee, his election shall be void; and if any Fellow resident within fifty miles of Boston shall neglect to pay his Annual Dues for six months after they are due, provided his attention shall have been called to this Article of the Statutes in the meantime, he shall cease to be a Fellow; but the Council may suspend the provisions of this Article for a reasonable time.

With the previous consent of the Council, the Treasurer may dispense (*sub silentio*) with the payment of the Admission Fee or of the Annual Dues or both whenever he shall deem it advisable. In the case of officers of the Army or Navy who are out of the Commonwealth on duty, payment of the Annual Dues may be waived during such absence if continued during the whole financial year and if notification of such expected absence be sent to the Treasurer. Upon similar notification to the Treasurer, similar exemption may be accorded to Fellows subject to Annual Dues, who may temporarily remove their residence for at least two years to a place more than fifty miles from Boston.

If any person elected a Foreign Honorary Member shall neglect for six months after being notified of his election to accept in writing, his election shall be void.

See Chap. vii, art. 2.

ARTICLE 5. Every Fellow resident within fifty miles of Boston hereafter elected shall pay an Admission Fee of Ten dollars, unless previously as an Associate he has paid an Admission Fee of like amount.

Every Fellow resident within fifty miles of Boston shall, and others may, pay such Annual Dues, not exceeding Fifteen dollars, as shall be voted by the Academy at each Annual Meeting, when they shall become due; but any Fellow shall be exempt from the annual payment if, at any time after his admission, he shall pay into the treasury Two hundred dollars in addition to his previous payments. Any Fellow shall also be exempt from Annual Dues who has paid such dues

for forty years, or, having attained the age of seventy-five has paid dues for twenty-five years.

All Commutations of the Annual Dues shall be and remain permanently founded, the interest only to be used for current expenses.

Any Fellow not previously subject to Annual Dues who takes up his residence within fifty miles of Boston, shall pay to the Treasurer within three months thereafter Annual Dues for the current year, failing which his Fellowship shall cease; but the Council may suspend the provisions of this Article for a reasonable time.

Only Fellows who pay Annual Dues or have commuted them may hold office in the Academy or serve on the Standing Committees or vote at meetings.

ARTICLE 6. Fellows who pay or have commuted the Annual Dues and Foreign Honorary Members shall be entitled to receive gratis one copy of all Publications of the Academy issued after their election.

See Chap. xi, art. 2.

ARTICLE 7. Diplomas signed by the President and the Vice-President of the Class to which the member belongs, and countersigned by the Secretaries, shall be given to Foreign Honorary Members and to Fellows on request.

ARTICLE 8. If, in the opinion of a majority of the entire Council, any Fellow or Foreign Honorary Member shall have rendered himself unworthy of a place in the Academy, the Council shall recommend to the Academy the termination of his membership; and if three-fourths of the Fellows present, out of a total attendance of not less than fifty at a Stated Meeting, or at a Special Meeting called for the purpose, shall adopt this recommendation, his name shall be stricken from the Roll.

See Chap. iii; chap. vi, art. 1; chap. x, art. 1, 7; chap. xi, art. 2.

CHAPTER III.

ELECTION OF FELLOWS AND FOREIGN HONORARY MEMBERS.

The procedure in the election of Fellows and Foreign Honorary Members shall be as follows:

Nominations to Fellowship or Foreign Honorary Membership in any Section must be signed by Two Fellows of that Section, or by three Fellows of any Sections, and sent to the Corresponding Secretary ac-

companied by a statement of the qualifications of the nominee and brief biographical data.

Notice shall be sent to every Fellow not later than the fifteenth of January in each year, reminding him that all nominations must be in the hands of the Corresponding Secretary before the fifteenth of February following.

A list of the nominees, giving a brief account of each, with the names of the nominators, shall be sent to every Fellow with a request that he return the list with such confidential comments and indications of preference as he may choose to make.

All the nominations, with any comments thereon and with expressions of preference on the part of the Fellows, shall be referred to the appropriate Class Committees, which shall canvass them, and report their recommendations in writing to the Council before the Stated Meeting of the Academy in April.

Elections of Fellows and Foreign Honorary Members shall be made by the Council before the Annual Meeting in May, and announced at that meeting.

Persons nominated in any year, but not elected, may be carried over to the list of nominees for the next year at the discretion of the Council, but shall not be further continued unless renominated.

See Chap. ii; chap. vi, art. 1; chap. x, art. 1.

CHAPTER IV.

Officers.

Article 1. The Officers of the Academy shall be a President (who shall be Chairman of the Council), four Vice-Presidents (one from each Class), a Corresponding Secretary (who shall be Secretary of the Council), a Recording Secretary, a Treasurer, a Librarian, and an Editor, all of whom shall be elected by ballot at the Annual Meeting, and shall hold their respective offices for one year, and until others are duly chosen and installed.

There shall be also sixteen Councillors, one from each Section of each Class. At each Annual Meeting four Councillors, one from each Class, shall be elected by ballot to serve for the full term of four years and until others are duly chosen and installed. The same Fellow shall not be eligible for two successive terms.

The Councillors, with the other officers previously named, and the Chairman of the House Committee, *ex officio*, shall constitute the Council.

See Chap. xi, art. 1.

ARTICLE 2. If any officer be unable, through death, absence, or disability, to fulfill the duties of his office, or if he shall resign, his place may be filled by the Council in its discretion for any part or the whole of the unexpired term.

ARTICLE 3. At the Stated Meeting in March, the President shall appoint a Nominating Committee of four Fellows having the right to vote, one from each Class. This Committee shall prepare a list of nominees for the several offices to be filled, and for the Standing Committees, and file it with the Recording Secretary not later than four weeks before the Annual Meeting.

See Chap. vi, art. 2.

ARTICLE 4. Independent nominations for any office, if signed by at least twenty Fellows having the right to vote, and received by the Recording Secretary not less than ten days before the Annual Meeting, shall be inserted in the call therefor, and shall be mailed to all the Fellows having the right to vote.

See Chap. vi, art. 2.

ARTICLE 5. The Recording Secretary shall prepare for use in voting at the Annual Meeting a ballot containing the names of all persons duly nominated for office.

CHAPTER V.

THE PRESIDENT.

ARTICLE 1. The President, or in his absence the senior Vice-President present (seniority to be determined by length of continuous Fellowship in the Academy), shall preside at all meetings of the Academy. In the absence of all these officers, a Chairman of the meeting shall be chosen by ballot.

ARTICLE 2. Unless otherwise ordered, all Committees which are not elected by ballot shall be appointed by the presiding officer.

ARTICLE 3. Any deed or writing to which the Corporate Seal is to be affixed, except leases of real estate, shall be executed in the name of the Academy by the President or, in the event of his death, absence, or inability, by one of the Vice-Presidents, when thereto duly authorized.

See Chap. ii, art. 7; chap. iv, art. 1, 3; chap. vi, art. 2; chap. vii, art. 1; chap. x, art. 6; chap. xi, art. 1, 2; chap. xii, art. 1.

CHAPTER VI.

THE SECRETARIES.

ARTICLE 1. The Corresponding Secretary shall conduct the correspondence of the Academy and of the Council, recording or making an entry of all letters written in its name, and preserving for the files all official papers which may be received. At each meeting of the Council he shall present the communications addressed to the Academy which have been received since the previous meeting, and at the next meeting of the Academy he shall present such as the Council may determine.

He shall notify all persons who may be elected Fellows or Foreign Honorary Members, send to each a copy of the Statutes, and on their acceptance issue the proper Diploma. He shall also notify all meetings of the Council; and in case of the death, absence, or inability of the Recording Secretary he shall notify all meetings of the Academy.

Under the direction of the Council, he shall keep a List of the Fellows and Foreign Honorary Members, arranged in their several Classes and Sections. It shall be printed annually and issued as of the first day of July.

See Chap. ii, art. 7; chap. iii; chap. iv, art. 1; chap. x, art. 6; chap. xi, art. 1; chap. xii, art. 1.

ARTICLE 2. The Recording Secretary shall have the custody of the Charter, Corporate Seal, Archives, Statute-Book, Journals, and all literary papers belonging to the Academy.

Fellows borrowing such papers or documents shall receipt for them to their custodian.

The Recording Secretary shall attend the meetings of the Academy and keep a faithful record of the proceedings with the names of the Fellows present; and after each meeting is duly opened, he shall read the record of the preceding meeting.

He shall notify the meetings of the Academy to each Fellow and by

mail at least seven days beforehand, and in his discretion may also cause the meetings to be advertised; he shall apprise Officers and Committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy.

After all elections, he shall insert in the Records the names of the Fellows by whom the successful nominees were proposed.

He shall send the Report of the Nominating Committee in print to every Fellow having the right to vote at least three weeks before the Annual Meeting.

See Chap. iv, art. 3.

In the absence of the President and of the Vice-Presidents he shall, if present, call the meeting to order, and preside until a Chairman is chosen.

See Chap. i; chap. ii, art. 7; chap. iv, art. 3, 4, 5; chap. x, art. 6; chap. xi, art. 1, 2; chap. xii, art. 1, 3.

ARTICLE 3. The Secretaries, with the Editor, shall have authority to publish such of the records of the meetings of the Academy as may seem to them likely to promote its interests.

CHAPTER VII.

THE TREASURER AND THE TREASURY.

ARTICLE 1. The Treasurer shall collect all money due or payable to the Academy, and all gifts and bequests made to it. He shall pay all bills due by the Academy, when approved by the proper officers, except those of the Treasurer's office, which may be paid without such approval; in the name of the Academy he shall sign all leases of real estate; and, with the written consent of a member of the Committee on Finance, he shall make all transfers of stocks, bonds, and other securities belonging to the Academy, all of which shall be in his official custody.

He shall keep a faithful account of all receipts and expenditures, submit his accounts annually to the Auditing Committee, and render them at the expiration of his term of office, or whenever required to do so by the Academy or the Council.

He shall keep separate accounts of the income of the Rumford Fund, and of all other special Funds, and of the Appropriation thereof, and render them annually.

His accounts shall always be open to the inspection of the Council

ARTICLE 2. He shall report annually to the Council at its March meeting on the expected income of the various Funds and from all other sources during the ensuing financial year. He shall also report the names of all Fellows who may be then delinquent in the payment of their Annual Dues.

ARTICLE 3. He shall give such security for the trust reposed in him as the Academy may require.

ARTICLE 4. With the approval of a majority of the Committee on Finance, he may appoint an Assistant Treasurer to perform his duties, for whose acts, as such assistant, he shall be responsible; or, with like approval and responsibility, he may employ any Trust Company doing business in Boston as his agent for the same purpose, the compensation of such Assistant Treasurer or agent to be fixed by the Committee on Finance and paid from the Funds of the Academy.

ARTICLE 5. At the Annual Meeting he shall report in print all his official doings for the preceding year, stating the amount and condition of all the property of the Academy entrusted to him, and the character of the investments.

ARTICLE 6. The Financial Year of the Academy shall begin with the first day of April.

ARTICLE 7. No person or committee shall incur any debt or liability in the name of the Academy, unless in accordance with a previous vote and appropriation therefor by the Academy or the Council, or sell or otherwise dispose of any property of the Academy, except cash or invested funds, without previous consent and approval of the Council.

See Chap. ii, art. 4, 5; chap. vi, art. 2; chap. x, art. 6; chap. xi, art. 1, 2, 3; chap. xii, art. 1.

CHAPTER VIII.

THE LIBRARIAN AND THE LIBRARY.

ARTICLE 1. The Librarian shall have charge of the printed books, keep a correct catalogue thereof, and provide for their delivery from the Library.

At the Annual Meeting, as Chairman of the Committee on the Library, he shall make a Report on its condition.

ARTICLE 2. In conjunction with the Committee on the Library he shall have authority to expend such sums as may be appropriated by the Academy for the purchase of books, periodicals, etc., and for defraying other necessary expenses connected with the Library.

ARTICLE 3. All books procured from the income of the Rumford Fund or of other special Funds shall contain a book-plate expressing the fact.

ARTICLE 4. Books taken from the Library shall be receipted for to the Librarian or his assistant.

ARTICLE 5. Books shall be returned in good order, regard being had to necessary wear with good usage. If any book shall be lost or injured, the Fellow to whom it stands charged shall replace it by a new volume or by a new set, if it belongs to a set, or pay the current price thereof to the Librarian, whereupon the remainder of the set, if any, shall be delivered to the Fellow so paying, unless such remainder be valuable by reason of association.

ARTICLE 6. All books shall be returned to the Library for examination at least one week before the Annual Meeting.

ARTICLE 7. The Librarian shall have the custody of the Publications of the Academy. With the advice and consent of the President, he may effect exchanges with other associations.

See Chap. ii, art. 6; chap. xi, art. 1, 2.

CHAPTER IX.

THE EDITOR AND THE PUBLICATIONS.

ARTICLE 1. The Editor shall have charge of the conduct through the press of the Proceedings and the Memoirs, and all correspondence relative thereto, and shall have power to fix the price at which individual numbers of the Proceedings and Memoirs are sold.

ARTICLE 2. In conjunction with the Committee of Publication, he shall have authority to expend such sums as may be appropriated by the Academy for printing the publications and for defraying other expenses therewith connected.

ARTICLE 3. All publications which are financed in whole or in part from the income of the Rumford Fund or from the income of other

special funds, and all publications of work done with the aid of the Rumford Fund or other special funds, shall contain a conspicuous statement of this fact.

ARTICLE 4. Two hundred extra copies of each paper printed in the Proceedings or Memoirs shall be placed at the disposal of the author without charge.

If, on account of the number of communications offered for publication, it shall be necessary to decline for publication communications otherwise acceptable, members of the Academy shall be given preference in each of the several Classes over non-members; but whenever it shall be necessary to exercise this preference, the Editor shall inform the Council of the fact.

See Chap. iv, art. 1; chap. vi, art. 3; chap. x, art. 6; chap. xi, art. 4.

CHAPTER X.

THE COUNCIL.

ARTICLE 1. The Council shall exercise a discreet supervision over all nominations and elections to membership, and in general supervise all the affairs of the Academy not explicitly reserved to the Academy as a whole or entrusted by it or by the Statutes to standing or special committees.

It shall consider all nominations duly sent to it by any Class Committee, and act upon them in accordance with the provisions of Chapter III.

With the consent of the Fellow interested, it shall have power to make transfers between the several Sections, reporting its action to the Academy.

See Chap. iii, art. 2, 3; chap. xi, art. 1.

ARTICLE 2. Nine members shall constitute a quorum.

ARTICLE 3. It shall establish rules and regulations for the transaction of its business, and provide all printed and engraved blanks and books of record.

ARTICLE 4. It shall act upon all resignations of officers, and all resignations and forfeitures of Fellowship; and cause the Statutes to be faithfully executed.

It shall appoint all agents and subordinates not otherwise provided for by the Statutes, prescribe their duties, and fix their compensation. They shall hold their respective positions during the pleasure of the Council.

ARTICLE 5. It may appoint, for terms not exceeding one year, and prescribe the functions of, such committees of its number, or of the Fellows of the Academy, as it may deem expedient, to facilitate the administration of the affairs of the Academy or to promote its interests.

ARTICLE 6. At its March meeting it shall receive reports from the President, the Secretaries, the Treasurer, and the Standing Committees, on the appropriations severally needed for the ensuing financial year. At the same meeting the Treasurer shall report on the expected income of the various Funds and from all other sources during the same year.

A report from the Council shall be submitted to the Academy, for action, at the March meeting, recommending the appropriation which in the opinion of the Council should be made.

On the recommendation of the Council, special appropriations may be made at any Stated Meeting of the Academy, or at a Special Meeting called for the purpose.

See Chap. xi, art. 3.

ARTICLE 7. After the death of a Fellow or Foreign Honorary Member, it shall appoint a member of the Academy to provide a biographical notice for publication in the Proceedings.

ARTICLE 8. It shall report at every meeting of the Academy such business as it may deem advisable to present.

See Chap. ii, art. 4, 5, 8; chap. iv, art. 1, 2; chap. vi, art. 1; chap vii, art. 1; chap. xii, art. 1, 4.

CHAPTER XI.

STANDING COMMITTEES.

ARTICLE 1. The Class Committee of each Class shall consist of the Vice-President, who shall be chairman, and the four Councillors of the Class, together with such other officer or officers annually elected as may belong to the Class. It shall consider nominations to Fellowship

in its own Class, and report in writing to the Council such as may receive at a Class Committee Meeting a majority of the votes cast, provided at least three shall have been in the affirmative.

See Chap. iii, art. 2.

ARTICLE 2. At the Annual Meeting the following Standing Committees shall be elected by ballot to serve for the ensuing year:

(i) *The Committee on Finance*, to consist of four Fellows, who, through the Treasurer, shall have full control and management of the funds and trusts of the Academy, with the power of investing the funds and changing the investments thereof in their discretion.

See Chap. iv, art. 3; chap. vii, art. 1, 4; chap. x, art. 6.

(ii) *The Rumford Committee*, to consist of seven Fellows, who shall report to the Academy on all applications and claims for the Rumford Premium. It alone shall authorize the purchase of books, publications and apparatus at the charge of the income from the Rumford Fund, and generally shall see to the proper execution of the trust.

See Chap. iv, art. 3; chap. x, art. 6.

(iii) *The Cyrus Moors Warren Committee*, to consist of seven Fellows, who shall consider all applications for appropriations from the income of the Cyrus Moors Warren Fund, and generally shall see to the proper execution of the trust.

See Chap. iv, art. 3; chap. x, art. 6.

(iv) *The Committee of Publication*, to consist of the Editor, *ex officio*, as Chairman, and four other Fellows, one from each Class, to whom all communications submitted to the Academy for publication shall be referred, and to whom the printing of the Proceedings and the Memoirs shall be entrusted.

It shall fix the price at which volumes of the publications shall be sold; but Fellows may be supplied at half price with volumes which they are not entitled to receive gratis.

It shall determine when the pressure of material offered for publication makes it necessary to give preference to members of the Academy as compared with non-members, or to give priority to certain members as compared with others, and to what extent this preference or priority shall be applied in each of the four Classes, to the

end that a proper balance of the facilities of publication with respect to subject matter and authors may be maintained.

See Chap. iv, art. 3; chap. vi, art. 1, 3; chap. ix; chap. x, art. 6.

(v) *The Committee on the Library*, to consist of the Librarian, *ex officio*, as Chairman, and four other Fellows, one from each Class, who shall examine the Library and make an annual report on its condition and management.

See Chap. iv, art. 3; chap. viii, art. 1, 2; chap. x, art. 6.

(vi) *The House Committee*, to consist of four Fellows, who shall have charge of all expenses connected with the House, including the general expenses of the Academy not specifically assigned to the care of other Committees or Officers.

See Chap. iv, art. 1, 3; chap. x, art. 6.

(vii) *The Committee on Meetings*, to consist of the President, the Recording Secretary, and four other Fellows, who shall have charge of plans for meetings of the Academy.

See Chap. iv, art. 3; chap. x, art. 6.

(viii) *The Auditing Committee*, to consist of two Fellows, who shall audit the accounts of the Treasurer, with power to employ an expert and to approve his bill.

See Chap. iv, art. 3; chap. vii, art. 1; chap. x, art. 6.

(ix) *The Committee on Biographical Notices*, to consist of six Fellows, two to be elected each year, six in 1933, one of them to be a Secretary of the Academy, to see that biographical notices of the Fellows are provided.

See Chap. x, art. 7.

ARTICLE 3. The Standing Committees shall report annually to the Council in March on the appropriations severally needed for the ensuing financial year; and all bills incurred on account of these Committees, within the limits of the several appropriations made by the Academy, shall be approved by their respective Chairmen.

In the absence of the Chairman of any Committee, bills may be approved by any member of the Committee whom he shall designate for the purpose.

See Chap. vii, art. 1, 7; chap. x, art. 6.

CHAPTER XII.

Meetings, Communications, and Amendments.

Article 1. There shall be annually eight Stated Meetings of the Academy, namely, on the second Wednesday of October, November, December, January, February, March, April, and May. Only at these meetings, or at adjournments thereof regularly notified, or at Special Meetings called for the purpose, shall appropriations of money be made or amendments of the Statutes or Standing Votes be effected.

The Stated Meeting in May shall be the Annual Meeting of the Corporation.

Special Meetings shall be called by either of the Secretaries at the request of the President, of a Vice-President, of the Council, or of ten Fellows having the right to vote; and notifications thereof shall state the purpose for which the meeting is called.

A meeting for receiving and discussing literary or scientific communications may be held on the fourth Wednesday of each month, excepting July, August, and September; but no business shall be transacted at said meetings.

Article 2. Twenty-five Fellows having the right to vote shall constitute a quorum for the transaction of business at Stated or Special Meetings. Eighteen Fellows shall be sufficient to constitute a meeting for literary or scientific communications and discussions.

Article 3. Upon the request of the presiding officer or the Recording Secretary, any motion or resolution offered at any meeting shall be submitted in writing.

Article 4. No report of any paper presented at a meeting of the Academy shall be published by any Fellow without the consent of the author; and no report shall in any case be published by any Fellow in a newspaper as an account of the proceedings of the Academy without the previous consent and approval of the Council. The Council, in its discretion, by a duly recorded vote, may delegate its authority in this regard to one or more of its members.

Article 5. No Fellow shall introduce a guest at any meeting of the Academy until after the business has been transacted, and especially until after the result of the balloting upon nominations has been declared.

ARTICLE 6. The Academy shall not express its judgment on literary or scientific memoirs or performances submitted to it, or included in its Publications.

ARTICLE 7. All proposed Amendments of the Statutes shall be referred to a committee, and on its report, at a subsequent Stated Meeting or at a Special Meeting called for the purpose, two-thirds of the ballot cast, and not less than twenty-five, must be affirmative to effect enactment.

ARTICLE 8. Standing Votes may be passed, amended, or rescinded at a Stated Meeting, or at a Special Meeting called for the purpose, by a vote of two-thirds of the members present. They may be suspended by a unanimous vote.

See Chap. ii, art. 5, 8; chap. iii; chap. iv, art. 3, 4, 5; chap. v, art. 1; chap. vi, art. 1. 2; chap. x, art. 8.

STANDING VOTES.

1. Communications of which notice has been given to either of the Secretaries shall take precedence of those not so notified.

2. Fellows may take from the Library six volumes at any one time, and may retain them for three months, and no longer. Upon special application, and for adequate reasons assigned, the Librarian may permit a larger number of volumes, not exceeding twelve, to be drawn from the Library for a limited period.

3. Works published in numbers, when unbound, shall not be taken from the Hall of the Academy without the leave of the Librarian.

4. The Council, under such rules respecting nominations as it may prescribe, may elect as Associates of the Academy a limited number of men of mark in affairs or of distinguished service in the community.

Associates shall be entitled to the same privileges as Fellows, but shall not have the right to vote.

The admission fee and annual dues of Associates shall be the same as those of Fellows residing within fifty miles of Boston.

5. Communications offered for publication in the Proceedings or Memoirs of the Academy shall not be accepted for publication before the author shall have informed the Committee on Meetings of his readiness, either himself or through some agent, to use such time as the Committee may assign him at such meeting as may be convenient both to him and to the Committee, for the purpose of presenting to the Academy a general statement of the nature and significance of the results contained in his communication.

RUMFORD PREMIUM.

In conformity with the terms of the gift of Sir Benjamin Thompson, Count Rumford, of a certain Fund to the American Academy of Arts and Sciences, and with a decree of the Supreme Judicial Court of Massachusetts for carrying into effect the general charitable intent and purpose of Count Rumford, as expressed in his letter of gift, the Academy is empowered to make from the income of the Rumford Fund, as it now exists, at any Annual Meeting, an award of a gold and a silver medal, being together of the intrinsic value of three hundred dollars, as a Premium to the author of any important discovery or useful improvement in light or heat, which shall have been made and published by printing, or in any way made known to the public, in any part of the continent of America, or any of the American islands; preference always being given to such discoveries as, in the opinion of the Academy, shall tend most to promote the good of mankind; and, if the Academy sees fit, to add to such medals, as a further Premium for such discovery and improvement, a sum of money not exceeding three hundred dollars.

INDEX

Absolute Temperature Scale, An Experimental Study of, 327.
Amory (Francis) Fund, 471.
Ancient Star Symbols and Constellations, 468.
Anglo-American Conference of Historians, 465.
Appleton, E. V., elected Foreign Honorary Member, 480.
Appropriations, 465, 466, 467.
Asín y Palacios, M., elected Foreign Honorary Member, 481.
Assessment, Annual, 478.
Aubert, M., elected Foreign Honorary Member, 481.

Barus, C. Biographical notice of, 484; Death of, 462.
Beattie, J. A., Benedict, M., Blaisdell, E. B. and Kaminsky, J., An Experimental Study of the Absolute Temperature Scale, 327.
Beeson, C. H., accepts Fellowship, 461.
Benedict, F. G. *See* Bruhn, J. M.
Benedict, M. *See* Beattie, J. A.
Biographical Notices, 483.
Bixler, J. S., The Skeptical Revolt, 481.
Blaisdell, E. B. *See* Beattie, J. A.
Blake, C. H., accepts Fellowship, 461.
Blake, R. P., Lake Van, 465.
Blanchard, R., elected Foreign Honorary Member, 480.
Books, Periodicals, and Binding, Appropriations for, 466, 467.
Bliss, G. A., accepts Fellowship, 461.
Bonner, R. J., accepts Fellowship, 461.
Bridgman, P. W., Compressibilities and Electrical Resistance under Pressure, 463; Shearing Phenomena at High Pressures, 387.
Brooks, W. K., Biographical notice of, 489.
Brues, C. T., Philippine Phoridae from the Mount Apo Region in Mindanao, 464.
Bruhn, J. M. and Benedict, F. G., The Respiratory Metabolism of the Chimpanzee, 259.
Burkitt, F. C., Death of, 466.
Burr, W. H., Death of, 468.
Byerly, W. E., Biographical notice of, 492; Death of, 465.

Cabot, R. C., resigns Fellowship, 463.
Calendar Simplification, 462.
Carpenter, F. M., Revision of the Nearctic Raphidiodea, 85, 465.
Carver, T. N., resigns Fellowship, 463.
Committees elected, 478; List of, 559.
Compressibilities and Electrical Resistance under Pressure, 463.
Coolidge, C. A., Death of, 468.
Council, Report of, 468.

Dana, E. S., Death of, 462.
Daniel, J. F., accepts Fellowship, 461.
Dennett, T. accepts Fellowship, 461.
Dodge, B. O., accepts Fellowship, 461.
Douglas, J., Some New Results in the Problem of Plateau, 464.
Drew, G. A., Biographical notice of, 494.
Ecological Relations of Ponerine and other Ants to Termites, 159.
Einaudi, L., accepts Foreign Honorary Membership, 461.
Emerton, E., Biographical notice of, 496.
Engler, A., Biographical notice of, 497.

Fassig, O. L., accepts Fellowship, 461.
Fellows, List of, 561.
Fellows deceased (20)—
C. Barus, 462.
W, H, Burr, 468.
W. E. Byerly, 465.
C. A. Coolidge, 468.
E. S. Dana, 462.
E. B. Frost, 462.
A. S. Hitchcock, 465.
C. L. Jackson, 464.
A .D. Little, 462.
C. M. T. Loeffler, 462.
D. G. Lyon, 464.
L. B. Mendel, 464.
C. E. Mendenhall, 462.
H. F. Osborn, 464.

M. Parry, 464.
B. L. Robinson, 462.
D. W. Ross, 462.
H. Taber, 465.
C. H. Walker, 468.
G. W. Wickersham, 466.
Fellows elected (34)—
J. W. Angell, 480.
O. T. Avery, 479.
S. Bell, 480.
H. L. Bevis, 480.
W. Bolster, 480.
J. C. Bonbright, 480.
H. S. Booth, 479.
C. R. Branch, 480.
C. S. Burwell, 479.
P. Cabot, 480.
R. P. Casey, 480.
E. H. Chamberlain, 480.
C. T. Davis, 480.
F. R. Fairchild, 480.
F. A. Fetter, 480.
A. B. Hastings, 479.
W. C. Heilman, 480.
F. L. Hisaw, 479.
M. P. Horwood, 479.
E. H. Huntress, 479.
M. B. Lambie, 480.
R. C. McCrea, 480.
M. P. McNair, 480.
D. Malone, 480.
E. Mayo, 480.
A. A. Morton, 479.
P. S. Parker, 480.
H. Parkman, Jr., 480.
S. E. Qua, 480.
T. H. Sanders, 480.
D. Scott, 480.
S. P. Simpson, 480.
C. E. Turner, 480.
J. H. Willits, 480.
Fisher, R. A., Uncertain Inference, 245.
Foreign Honorary Members, List of, 584.
Foreign Honorary Members deceased (6)—
F. C. Burkitt, 466.
R. Kipling, 466.
S. Lévi, 464.
K. Pearson, 468.
Marquess of Reading, 465.
H. de Vries, 462.
Foreign Honorary Members elected (6)—
E. V. Appleton, 480.
M. Asín y Palacios, 481.
M. Aubert, 481.
R. Blanchard, 480.
P. Kretschmer, 481.
H. Vincent, 480.
Frank, T., accepts Fellowship, 461.
Frost, E. B., Biographical notice of, 500; Death of, 462.

General and Meeting Expenses, Appropriation for, 466.
General Fund, 469; Appropriations from, 465, 466.
Gerry, H. T., *See* Keyes, F. G.
Greene, J. D., accepts Fellowship, 461.

Haldane, R. B., Biographical notice of, 503.
Haines, C. G., accepts Fellowship, 461.
Harris, L., accepts Fellowship, 461.
Hartner, W., Ancient Star Symbols and Constellations, 468.
Harvard University, Tercentenary of, 465, 466.
Hitchcock, A. S., Biographical notice of, 505; Death of, 465.
House Committee, Report of, 476.
House Expenses, Appropriation for, 466.
Howard, A. A., Biographical notice of, 507.
Hull, C. L., accepts Fellowship, 461.

Jackson, C. L., Death of, 464.
Johnston, I. M., A Study of the Nolanaceae, 1, 465.
Joffre, J. J. C., Biographical notice of, 508.

Kaminsky, J. *See* Beattie, J. A.
Keyes, F. G., Smith, L. B., and Gerry H. T., The Specific Volume of Steam in the Saturated and Superheated Condition, 464.
Keynes, J. M., accepts Foreign Honorary Membership, 461.
Kipling, R., Death of, 466.
Kitasato Memorial Library, 463.
Kretschmer, P., elected Foreign Honorary Member, 481.
Kurath, H., The Speech of Coastal New England, 463.

Lake, K., The New Manuscripts from Egypt, 466.
Lake Van, 465.

Lévi, S., Death of, 464.
Lewis, L. R., Possibilities as to a Thematic Catalogue of the World's Music, 464.
Library Committee, Report of, 471.
Library Expenses, Appropriations for, 466.
Little, A. D., Biographical notice of, 513; Death of, 462.
Loeffler, C. M. T., Biographical notice of, 519; Death of, 462.
Lyon, D. G., Death of, 464.

McKeehan, L. W., The Structure of Intermetallic Compounds, 463.
Martin, E. G., Biographical notice of, 523.
Maunier, R., accepts Foreign Honorary Membership, 461.
Mead, W. J., accepts Fellowship, 461.
Meillet, A., Biographical notice of, 524.
Mendel, L. B., Biographical notice of, 527; Death of, 464.
Mendenhall, C. E., accepts Fellowship, 461; Biographical notice of, 529; Death of, 462.
Meritt, B. D., accepts Fellowship, 461.
Meyer, K. F., accepts Fellowship, 461.
Michelson, A. A., Biographical notice of, 530.
Milas, N. A., accepts Fellowship, 461.
Military Telegraph in the Civil War, 464.
Mimno, H. R., Recent Progress in Radio Transmission Research, 467.
Murdock, H., Biographical notice of, 533.
Murray, H. A., Jr., accepts Fellowship, 461.

Nearctic Raphidiodea, Revision of the, 85, 465.
New Manuscripts from Egypt, 466.
Nolanaceae, A Study of the, 1, 465.
Nominating Committee, 466.

Officers elected, 478; List of, 559.
Osborn, H. F., Death of, 464.

Parry, M., Biographical notice of, 535; Death of, 464.
Pearson, K., Death of, 468.
Permanent Science Fund, 471; Grants from, 461, 463, 467.
Philippine Phoridae from the Mount Apo Region in Mindanao, 464.
Pound, R., The Military Telegraph in the Civil War, 464.
Prescott, H. W., accepts Fellowship, 461.
President's Fund, Appropriations for, 465, 466.
Problem of Plateau, Some New Results in the, 464.
Publication Committee, Report of, 475.
Publication Funds, 470; Appropriation from, 466.
Putnam, T. J., accepts Fellowship, 461.

Radio Transmission Research, Recent Progress in, 467.
Reading, Marquess of, Death of, 465.
Records of Meetings, 461.
Respiratory Metabolism of the Chimpanzee, 259.
Richardson, W. L., Biographical notice of, 536.
Richtmyer, F. K., accepts Fellowship, 461.
Robinson, B. L., Biographical notice of, 539; Death of, 462.
Ross, D. W., Biographical notice of, 543; Death of, 462.
Rumford Committee, Report of, 473.
Rumford Fund, 469; Appropriations from, 467.
Rumford Premium, 618.

Sanders, H. A., accepts Fellowship, 461.
Scott, J. B., accepts Fellowship, 461.
Shattuck, H. L., accepts Fellowship, 461.
Shearing Phenomena at High Pressures, 387.
de Sitter, W., Biographical notice of, 546.
Skeptical Revolt, The, 481.
Smith, J., Jr., Biographical notice of, 549.
Smith, L. B., *See* Keyes, F. G.
Smith, Sir W. W., accepts Foreign Honorary Membership, 461.
Spalding, W. R., accepts Fellowship, 461.
Specific Volume of Steam in the

Saturated and Superheated Condition, 464.
Speech of Coastal New England, 463.
Standing Votes, 617.
Statutes, 601.
Steinmetz, S. R., accepts Foreign Honorary Membership, 461.
Stiles, P. G., Biographical notice of, 550.
Storey, M., Biographical notice of, 552.
Structure of Intermetallic Compounds, 463.

Taber, H., Death of, 465.
Thematic Catalogue of the World's Music, Possibilities as to a, 464.
Treasurer, Report of, 469.
Treasurer's Expenses, Appropriation for, 466.

University of London, Centenary Celebrations, 466.
University of Oregon, Inauguration of President, 465.
Uncertain Inference, 245.

Van de Graaff, R. J., accepts Fellowship, 461.
Vincent, H., elected Foreign Honorary Member, 480.
de Vries, H., Death of, 462.

Walker, C. H., Death of, 468.
Warren, B. E., accepts Fellowship, 461.
Warren (C. M.) Committee, Report of, 474.
Warren (C. M.) Fund, 470; Appropriation from, 467.
Wheeler, W. M., Ecological Relations of Ponerine and other Ants to Termites, 159.
Whittlesey, D. S., accepts Fellowship, 461.
Wickersham, G. W., Biographical notice of, 556; Death of, 466.
Woodworth, R. S., accepts Fellowship, 461.
World Calendar, 463.

Q
11
A. 6

MAY

71—10

Proceedings of the American Academy of Arts and Sciences

VOL. 71, NO. 10—MARCH, 1937

RECORDS OF MEETINGS, 1935-36

BIOGRAPHICAL NOTICES

OFFICERS AND COMMITTEES FOR 1936-1937

LIST OF THE FELLOWS AND FOREIGN HONORARY MEMBERS

STATUTES AND STANDING VOTES

RUMFORD PREMIUM

INDEX

(TITLE PAGE AND TABLE OF CONTENTS)

(Continued from page 3 of Cover)

VOLUME 71

1. JOHNSTON, IVAN M.—A study of the Nolanaceae. pp. 1–87 April, 1936. $1.45.
2. CARPENTER, F. M.—Revision of the Nearctic Raphidiodea (Recent and Fossil) pp. 89–157. April, 1936. $1.20.
3. WHEELER, WILLIAM MORTON.—Ecological Relations of Ponerine and other Ants to Termites. pp. 159–243. October, 1936. $1.35.
4. FISHER, RONALD AYLMER.—Uncertain Inference. pp. 245–258. October, 1936. $0.45.
5. BRUHN, JOHN M. AND BENEDICT, FRANCIS G.—The Respiratory Metabolism of the Chimpanzee. pp. 259–326. November, 1936. $1.20.
6 7, and 8. BEATTIE, JAMES A., BENEDICT, MANSON, BLAISDELL, EDWIN B. AND KAMINSKY, JOSEPH.—An Experimental Study of the Absolute Temperature Scale. pp 327–385. January, 1937. $1.20
9. BRIDGMAN, P. W.—Shearing Phenomena at High Pressures, Particularly in Inorganic Compounds. pp. 387–460. January, 1937. $1.20.
10. RECORDS OF MEETINGS; Biographical Notices; Officers and Committees; List of Fellows and Foreign Honorary Members; Statutes and Standing Votes, etc.; pp. 461–618. March, 1937. $2.25.

VOLUME 70

1 BRIDGMAN, P. W.—The Melting Curves and Compressibilities of Nitrogen and Argon. pp. 1–32. March, 1935. $0.65.

2. WHEELER, WILLIAM MORTON, MACCOY, CLINTON V., GRISCOM, LUDLOW, ALLEN, GLOVER M., AND COOLIDGE, HAROLD J., JR.—Observations on the Behavior of Animals During the Total Solar Eclipse of August 31, 1932. pp. 33–70 March, 1935. $0.75.

3. BRIDGMAN, P. W.—Measurements of Certain Electrical Resistances, Compressibilities, and Thermal Expansions to 20000 kg/cm². pp 71–101. April, 1935 $0.75.

4. CARPENTER, FRANK M.—The Lower Permian Insects of Kansas Part 7. The Order Protoperlaria. pp. 103–146. May, 1935. $0.90.

5. SMITH, LYMAN B.—Studies in the Bromeliaceae, VI. pp. 147–220. August, 1935. $1.35.

6. WU, LU-CH'IANG AND DAVIS, TENNEY L.—Ko Hung on the Gold Medicine and on the Yellow and the White. pp. 221–284. December, 1935. $1.25.

7. BRIDGMAN, P. W.—Compressibilities and Electrical Resistance under Pressure, with special reference to Intermetallic Compounds. pp. 285–317. December, 1935. $0.75.

8. KEYES, FREDERICK G., SMITH, LEIGHTON B., AND GERRY, HAROLD T.—The Specific Volume of Steam in the Saturated and Superheated Condition Together With Derived Values of the Enthalpy, Entropy, Heat Capacity and Joule Thomson Coefficients. Part IV. Steam Research Program. pp. 319–364. February, 1936. $1.00.

9. BRUES, CHARLES T.—Philippine Phoridae from the Mount Apo Region in Mindanao. pp. 365–466. February, 1936. $1.50.

10. RECORDS OF MEETINGS; Biographical Notices; Officers and Committees; List of Fellows and Foreign Honorary Members; Statutes and Standing Votes, etc ; pp. 467–672. March, 1936. $2.25.

(Continued on page 2 of cover)

PUBLICATIONS

OF THE

AMERICAN ACADEMY OF ARTS AND SCIENCES

MONUMENTA PALAEOGRAPHICA VETERA. SERIES I. Dated Greek Minuscule Manuscripts to the year 1200. Edited by Kirsopp Lake and Silva Lake:

Fasciculus I. Manuscripts at Jerusalem, Patmos, and Athens. 20 pp. pls. 1–77. July, 1934. Fasciculus II. Manuscripts in Venice, Oxford, and London. 18 pp. pls. 78–151. December, 1934.

Fasciculus III. Manuscripts in Monasteries of Mount Athos and in Milan. 18 pp. pls. 152–225. July, 1935. Fasciculus IV. Manuscripts in Paris. 17 pp. Pls. 226–300. October, 1935.

Fasciculus V. Manuscripts in Paris, Part II; Oxford, Berlin, Vienna, and Jerusalem. 20 pp. pls. 301–373. June, 1936. Fasciculus VI. Manuscripts in Moscow and Leningrad. 17 pp. pls. 374–452. November, 1936.

Annual subscription (two fasciculi), $20.00. Separate fasciculi, $12.00 each.

MEMOIRS. OLD SERIES, Vols. 1–4; NEW SERIES, Vols. 1–17. 21 volumes $10 each. Half volumes, $5 each. Discount to booksellers and Libraries 25%; to Fellows 50%, or for whole sets 60%.

Vol. 16. Thaxter, R.—Contributions Toward a Monograph of the Laboulbeniaceæ, Part V. pp. 1–435. 60 pls. June, 1931. $10.00.

Vol. 17. 1. Fernald, M. L.—The Linear-Leaved North American Species of Potamogeton, Section Axillares. pp. 1–183. 40 pls. July, 1932. $5.00.

2. Cleveland, L. R., in collaboration with S. R. Hall, Elizabeth P. Sanders, and Jane Collier.—The Wood-Feeding Roach Cryptocercus, its Protozoa, and the Symbiosis between Protozoa and Roach. pp. 185–342. 60 pls. August, 1934. $6.50.

Vol. 18. 1. Kellogg, Oliver D., and Sullivan, Mildred M.—The Boundary Values of Potentials and their Derivatives—their Dependence on the Boundary. pp. 1–47. July, 1935. $2.00.

2. Heidel, W. A.—Hecataeus and the Egyptian Priests in Herodotus, Book II. pp. 49–134. October, 1935. $2.00.

PROCEEDINGS. Vols. 1–71, $5 each. Discount to booksellers and Libraries 25%; to Fellows 50%, or for whole sets 60%.

The individual articles may be obtained separately. A price list of recent articles is printed on the inside pages of the cover of the Proceedings.

Complete Works of Count Rumford. 4 vols., $5.00 each.
Memoir of Sir Benjamin Thompson, Count Rumford, with Notices of his Daughter. By George E. Ellis. $5.00.
Complete Sets of the Life and Works of Rumford. 5 vols., $25.00; to Fellows, $5.00.

For sale at the Library of THE AMERICAN ACADEMY OF ARTS AND SCIENCES, 28 Newbury Street, Boston, Massachusetts.